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SEWAGE DISPOSAL BY THE ACTIVATED SLUDGE PROCESS*

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AT THE MAY meeting in 1914 of the Manchester Section of the Society of Chemical Industry of Great Britain, Messrs. Ardern & Lockett published the first notice that a new process of sewage treatment was being developed by them with great promise of success. They termed it "M7." Shortly after the paper was published the process was mentioned in England as the "live earth" process, but when it reached America it was given the name of "activated sludge" as representative of the usual American expressiveness.

Before Dr. Gilbert J. Fowler of Manchester University, expressed his ideas to Messrs. Ardern & Lockett, upon which the latter's experiments were based, he visited the experimental station of the State Board of Health of Massachusetts at Lawrence, where Mr. H. A. Clark had been carrying on some experiments with enforced aeration through sewage while being retained in beds of slate, and who had obtained results which claimed the attention of many sanitary engineers. From a study of these experiments Dr. Fowler secured his ideas which finally led to the laboratory development of the activated sludge process.

Professor Phelps of the Massachusetts Institute of Technology, and Col. Black of the U. S. army, had been making, about this time, some very interesting experiments on enforced aeration in connection with their studies of the sewage disposal problem for the city of New York, the results of which indicated that enforced aeration might be used with advantage to remove the major portion of the suspended

solids from the New York sewage and thus secure sufficient clarification to discharge the effluent into the harbor without appreciable nuisance.

In fact, for a great many years investigators from time to time have been experimenting with sewage treatment by means of enforced or natural aeration, and with more or less success. The modern percolating or sprinkling filter is but a form of enforced aeration by which the oxidation of the organic matters contained in the sewage is accelerated, and the nitrifying organisms are given that excess oxygen necessary for performing their best work.

But until the development of the "activated sludge" process the virtue in the sludge itself was never recognized. In all other processes the aim has been to separate the suspended matters as quickly as possible from the sewage, reduce them to the form of sludge, and then get rid of the sludge without bringing the two into further contact.

Plain sedimentation, chemical precipitation, septic process and the Imhoff tank fermentation process are all based upon a complete separation, so far as possible, of the solids from the sewage and within the shortest time. On the other hand the activated sludge process aims to keep the sludge in the most intimate contact with the sewage throughout the whole period of treatment up to the point of final sedimentation; most of the purification having been effected when the process reaches this point.

Every sewage treatment investigator knew that fresh sludge contained myriads

of reducing and nitrifying bacteria, but it remained for Dr. Fowler to discover the art of making those bacteria contained in the sludge produced from one day's sewage to separate from and turn into willing co-workers the bacteria contained in the next day's sewage, thus separating from the sewage itself the very medium which nature has provided for its ultimate purification and intensifying the numbers and work of such media, so that the purification may be accomplished in the shortest time.

Knowing, as we do, that all organic matter is finally reduced to some form of mineral matter through decomposition, and that this decomposition is accomplished by micro-organisms of many kinds provided by nature for the ultimate protection of mankind, it seems quite logical to use artificial means to create and multiply such micro-organisms to the fullest extent to reduce as quickly as possible the filthy organic matter produced by the human body. Now this is just what the activated sludge process aims to do.

With a sewage containing say one million bacteria per cubic centimeter it will produce sterility, if carried out to its ultimate possibilities, and these bacteria, so separated, will become attached to the flocculent sludge, every particle of which is in intimate contact with the sewage as it passes through the aerating tanks, until it contains from 15 to 20 millions bacteria per cubic centimeter, and when the sludge reaches this activated condition good purification is bound to result.

Let us stop here just a moment to consider the character of those bacteria which, it is believed, perform the major part of the purification. There are at least three classes of bacteria which are known to be highly efficient in reducing organic matter if given their natural environments: anaerobic, aerobic and facultative. The first exists and works in the absence of oxygen. The second to do its best work must have a plentiful supply of oxygen, while the third partakes of the nature of both of the others and can work either with or without oxygen.

Plain sedimentation, chemical precipitation, septic and Imhoff tank processes use the anaerobic and facultative bacteria which reduce the organic matters by fermentation processes, and thus produce odors to a greater or less extent.

Percolating or sprinkling filters, sand filters, contact beds, land treatment and activated sludge process use the aerobic and facultative aerobic bacteria and thus produce no odors. Those of you who have smelled the odors from a sprinkling filter are likely to doubt this statement, but consider that the influent fed to the modern sprinkling filter has first passed through an anaerobic process of some kind which has started fermentation which must be overcome before the aerobic bacteria can reduce or dissolve the odors.

Therefore in the modern sprinkling system, the two processes of sedimentation and aeration are diametrically opposed to each other, and therefore the highest efficiency cannot be expected.

The activated sludge process consists of surrounding the aerobic and facultative bacteria with those natural environments which produce an intensified creative and working power, and it is the only process, except land treatment, producing a similar affluent wherein the sewage is given but one treatment.

The raw coarse screened sewage is run into and through a tank which contains a certain quantity of activated sludge. During its passage this sludge is intimately mixed with the sewage by means of air in the form of small bubbles forced through the mixture.

A small portion of this air is consumed by the mixture of sludge and sewage, but the major portion passes off unused except for its mechanical power. It is believed that the colloids contained in the sewage are largely removed by the scrubbing action due to the violent disturbance of the liquid, and are absorbed by the activated sludge. Whether this is or is not the manner in which the colloids are removed it is true that the process produces a sparkling effluent long before nitrification occurs.

After the sewage has been in intimate contact with the activated sludge for a certain period (depending entirely upon the character of effluent required), it passes into a final sedimentation tank, carrying with it such portion of the sludge as may be mixed with it.

Owing to the flocculent nature of this sludge most of it settles very rapidly to the bottom of this tank from which the clari-

fied liquor passes to its ultimate point of disposal. That portion of the sludge which settles in the sedimentation tank is highly activated, and in order to keep the aerating tanks constantly supplied with the proper proportion of activated sludge, some of it must be returned to the raw sewage as it enters the aerating tanks, the balance must be removed at frequent intervals in order to maintain the proper sedimentation area in the tank and to prevent septic action which occurs if sludge of this character is subjected to anaerobic influences, as it would be in the bottom of a deep tank.

One of the primary features of this process is that it is susceptible of producing any standard of effluent required to meet the local conditions, and its first and operating costs are almost directly proportional

to the degree of purification demanded. The three principal items which effect the degree of purification and the cost are volume of air, period of aeration and volume of activated sludge required in the mixture. The greater the volume of air per gallon of sewage treated the greater the fuel cost. The longer period of aeration and the greater the volume of activated sludge required in the aeration chamber the greater the size of the tanks and their first cost.

One of the most comprehensive statements of the results obtained by variation in volume of air mixed with the sewage is that published by Mr. E. E. Sands, City Engineer, in his report of his experiments conducted for the City of Houston, Texas, issued February 1, 1916, and from which the following table is extracted in brief:

TABLE NO. 1

TABLE EXTRACTED FROM PAGE 44 OF MR. E. E. SAND'S REPORT ON SEWAGE DISPOSAL FOR THE CITY OF HOUSTON, TEXAS.

ITEM	CRUDE SEWAGE Parts Per Million	Percentage of Removal in			
		1 hr.	2 hrs.	3 hrs.	4 hrs
Total Organic Nitrogen	5.5	64	65	66	67
Free Ammonia	6.32	60	82	90	95
Dissolved Oxygen	103	97	98	98	98
Suspended Matters	253	98	98	98	98
Nitrites and Nitrates	Trace	4	8	10	11
Bacteria at 20°C. per C.C.	2,800,000	93.7	95.8	95.8	95.8

These results are averages from a large number of samples. The aerating tanks contained from 25 per cent. to 30 per cent. of activated sludge. The sewage was treated with 0.437 cu. feet of free air per hour per gallon of sewage.

These results are averages from a large number of samples. The aerating tanks contained from 25 per cent. to 30 per cent. of activated sludge, and the mixture of sewage and sludge was treated with 0.437 cubic feet of free air per hour per gallon of sewage.

Diagnosing this statement it can be plainly distinguished that in Mr. Sand's experiments the clarification and bug removal were effected in the first hour with less than one-half cubic feet of free air per gallon of sewage treated; but it required four hours to reduce the free ammonia to nitrates. In other words if a clear effluent with few bugs fit the local conditions one hour's aeration is all that is required, whereas if a stable effluent is demanded four hours aeration must be given.

From this statement it must not be concluded that in order to secure the results shown in Mr. Sand's statement for the first hour, all that is necessary is to furnish 0.437 cubic feet of free air and aerate the sewage one hour, because this small volume of air and short period of aeration would soon impoverish the activated sludge which requires much more air than the raw sewage if the process is to be uniformly maintained.

While Mr. Sands makes no statement of this fact in his report, he has made provision for this in the large plant which he has recently designed for treating the sewage of the city of Houston by the activated sludge process wherein he provides for an average aeration period of 1 hour and 50 minutes for the sewage and 4 hours and 30 minutes for the sludge.

The investigations in Milwaukee upon the changes occurring in the sewage during the process gave somewhat similar results to those secured at Houston, although they were not as rapid.

The following table shows the average results obtained.

Attention is particularly called to two or three things appearing in Table No. 2, viz.:

The progressive steps required to convert the free ammonia into nitrites and finally into nitrates. How little is accomplished the first and second hours, and how much during the third, fourth and fifth hours. Following this characteristic is the rapid increase in dissolved oxygen and the stability of the liquor. Indicating pretty clearly that if a stable effluent is required good nitrification must be established.

sludge for 4 hours with about 1.75 cubic feet of free air per gallon of sewage treated.

As the sludge is precipitated to the bottom of the sedimentation tank it contains approximately 98 to 99 per cent. water; therefore to get a mixture of 25 per cent. of sludge back into the aerating chamber a volume equal to about 40 per cent. of the raw sewage must be returned; that is, the mixture of sewage and sludge passing through the aerating chamber will approximate 140 per cent. of the raw sewage being treated. This fact must not be lost sight of in determining the size of the aerating chambers in allowing for a certain period of detention.

In order to determine the percentage of sludge in the aerating chamber the Milwaukee practice has been to fill a calibrated tube with the mixture, and at the end of

TABLE NO. 2
STATEMENT OF CERTAIN CHARACTERISTICS OF ACTIVATED SLUDGE PROCESS AS OBSERVED AT MILWAUKEE, WIS.

ITEM	CRUDE SEWAGE Parts Per Million	Characteristic Changes in				
		1 hr.	2 hrs.	3 hrs.	4 hrs.	5 hrs.
Free Ammonia	20.3	14.9	13.2	11.1	9.3	7.4
Nitrites	0.12	0.25	0.84	1.25	1.37	1.56
Nitrates	0.09	0.69	1.24	3.28	5.71	7.90
Dissolved Oxygen	0.03	0.51	2.30	4.14	5.56	5.70
Stability in Hours	0.0	9.4	4.5	120	120+	120+
Bacteria at 20°C. per C.C.	466,000	71,800	27,000	11,800	6,800	2,900

The aerating tanks contained from 20 per cent. to 30 per cent. of activated sludge. The sewage was treated with 0.375 cu. feet of free air per hour per gallon of sewage.

The greatest effect upon bacterial removal occurs during the first hour. This is doubtless due to two things, the rapid digestion powers of the organisms in the activated sludge, and the flocculent character of the sludge to which these bacteria naturally adhere just as they do in the floc produced by chemical precipitation.

The amount of activated sludge mixed with the raw sewage as it is being aerated affects the degree of purification to an important extent. To obtain an equal standard of effluent, if the sludge volume is reduced the volume of air must be correspondingly increased and the period of aeration. The Milwaukee experiments indicate that a clear and stable effluent can be obtained from the Milwaukee sewage by mixing from 20 to 25 per cent. of activated

one-half hour determine by volume the percentage of sludge settled.

One of the important features of this process is the proper design of the sedimentation tanks. The sludge is quite different in character to that produced from any other sewage treatment process. If allowed to come to rest in a test tube or bottle 95 per cent. will settle out in 5 minutes, but there is a very fine floc of a low specific gravity which remains in suspension for a much longer period, and if disturbed by the slightest current will continue in suspension.

This fine floc, with much of the coarser light floc, will remain in suspension in a properly designed tank in the form of a sludge blanket which can be maintained with its surface within six inches to one

foot below the surface of the liquor in the tank. If the influent is discharged into the tank a few feet below the surface of this blanket so as to produce an upward velocity of not over 12 to 16 feet per hour the fine floc will be caught and retained by the blanket and prevented from passing out with the effluent.

It is therefore believed that the vertical upward flow sedimentation tanks producing slow velocities with ample capacity for precipitated sludge are far more applicable for satisfactory operation than horizontal flow tanks, and that the sludge blanket above referred to is essential if clear effluent is desired.

In Milwaukee many experiments have been made to determine the best apparatus and method for diffusing the air through the mixture of raw sewage and sludge. So far the Filtros plate as manufactured by the Central Filtration Company of Rochester, New York, appears to be the best media, but we believe this can be greatly improved. As now manufactured the uniformity of porosity is not satisfactory and the loss in friction of the air passing through the plate is too great. This company is now carrying out a line of experiments to correct these difficulties.

We have been experimenting recently with a wooden block cut across grain from bass-wood which appears to give some promise. There is no doubt, however, as the demand for a satisfactory diffuser grows greater such a one will be produced.

Some experimenters suggest a perforated pipe for diffusing the air. We have tried that experiment pretty thoroughly, and while very satisfactory results were obtained, it required much more air and longer period of aeration to secure the same amount of nitrification. If the Filtros plate, or other type of diffuser is likely to cause serious trouble to maintain, it may be less expensive to use the perforated pipe even though more air is required.

Many queries have been received as to whether these diffusers become stopped up by the dust in the air or by absorption of the sludge. In answer to this it might be said that after 9 months' continuous use in Milwaukee we find no evidence of such stoppage, although all the air supplied to the diffusers passes through a wood wool filter, and the blower producing the air is so designed that no lubricating oil can reach the air discharge pipe.

One of the difficulties we have found should be mentioned. The heavier sludge, composed of wastes, small pieces of leather, hair and entrails from the packing houses accumulate in masses and settle upon the surface of the diffusers until the air builds up enough to partially remove them. This has required the removal of these large masses by hand at infrequent intervals. It is a matter which must be considered in operating this process, and to overcome the difficulty it may prove desirable to pass the raw sewage through medium fine screens, although fine screens are to be avoided if possible.

In an American industrial city those employed in machine shops seem to be very profligate with waste. This appears to be particularly true in Milwaukee, where, from one intercepting sewer, there has been removed from the coarse bar screens, during five hours, a bushel basket half full of waste. This material has been one of the most troublesome to deal with in all processes of sewage treatment. An educational campaign amongst the shops might partially correct the difficulty.

Whether this heavy sludge which now remains near the bottom of the aerating tanks can be more effectually lifted and mixed with the whole body of the sewage by inserting vertical cross baffles in the tanks is a matter now being investigated. It may be such baffles will play a quite important part in more thoroughly mixing the sludge and sewage by the expenditure of less air. The fundamental principle of the aerating tank is thorough mixing and practical means of accomplishing this result will add to the efficiency of the tank.

The sludge disposal problem has been the most difficult one to solve in all modern sewage treatment plants, and it was a specially hard one for Milwaukee until the activated sludge process was developed, because there is absolutely no waste ground in or around the city upon which sludge could be deposited, and while, for a few years perhaps, it might be dumped into the lake several miles from shore, it is to be devoutly hoped that the Federal Government will shortly prohibit this method of sludge disposal in all fresh water under its jurisdiction.

One only has to inspect a few of the more modern sewage disposal plants in England to realize what a problem the disposal of sludge is bound to become if we must depend upon wasting it. Fresh or dried sew-

age sludge is not a thing of beauty under the most favorable conditions, and it does give off more or less unpleasant odors. No one desires it upon or nearby his property, and unfortunately it keeps producing every day in the year until its disposal becomes a nightmare to those responsible for its disposition.

So far sludges produced from plain sedimentation, chemical precipitation, septic and Imhoff tanks have contained so little ammonia, phosphoric acid, and potash, that their value as a fertilizer is too small to warrant the cost of reduction, although it is true that during the favorable seasons of the year farmers can be induced to take some sludges as tankage, but on the whole,

such disposition cannot be relied upon and so far no profit worth noting has been made from it either in Europe or America.

It is believed by us in Milwaukee that this new process has solved the sludge disposal problem advantageously even to the smaller cities. During our experiments a large number of sludge analyses have been made, not only by our own chemists, but by those in the fertilizer departments of the Chicago packing companies, and these have all shown a high value available as a fertilizer. The following is a representative analysis with the commercial values set forth as given by those in the employ of the fertilizer producers:

ANALYSIS OF ACTIVATED SLUDGE—MILWAUKEE.

Ingredients.	Per cent. dry basis.	Pounds per ton.	Value per ton.	Total value.
Fats.	2.00	40.	\$0.04	\$1.60
Available phosphoric acid.	1.66	33.2	.005	.17
Insoluble phosphoric acid.	0.54	10.8
Total phosphoric acid.	2.20	44.0
Nitrogen.	5.71	114.2
Ammonia.	6.94	138.8	.10	13.88
Potash.	0.43	8.6	.03	.26
				<hr/> \$15.91

The apparent value of this sludge is \$15.91, but the speaker believes from the information secured from the fertilizer producers, the only real value to the city of Milwaukee will be the available ammonia, upon the basis of which the dried sludge will be sold. This amounts to \$13.88, but because of the probable variation in the ammonia content, and in order to be conservative, he has estimated an average value of \$12.00 per dry ton.

Where sludges contain less than 10 per cent. of fat its value hardly pays for the cost of extraction, and such a quantity does not injure the sludge for a fertilizer.

The Milwaukee sewage produces from 3,000 to 5,000 gallons of sludge per million gallons of sewage treated, and when removed from the sedimentation tanks contains from 97 per cent. to 99 per cent. of water. About one-half a ton of dried sludge is produced from this volume of sludge or one-half of marketable fertilizer per million gallons of sewage treated. It is therefore believed the sludge can be sold for \$6.00 per million gallons of sewage treated.

At the present time we are experimenting with a Berrigan press manufactured by

H. R. Worthington of Harrison, New Jersey, and find no difficulty in dewatering this sludge to 74 per cent. moisture. Mr. Winthrop R. Pratt of Cleveland is also experimenting with a centrifuging machine of the laundry type, and so far appears to be securing promising results. In neither case has it been found necessary to use lime, or other substance, in pressing this sludge to an one-inch-thick cake.

While its further dewatering through direct or indirect driers has not been tried out by us there seems to be no doubt from the daily experience of the Chicago packing houses in the drying of their tankage and liquid manure that this sludge can be quite as easily and economically dewatered to 10 per cent. basis, which is the moisture content allowable in fertilizer. In fact there are several driers in use in many industrial establishments which are satisfactorily operating on a similar material, and the speaker has secured from some of the manufacturers of driers guarantees which cover the cost of drying the sludge we are producing from 80 per cent. to 10 per cent. moisture, exclusive of handling.

While we have not completed our dewatering experiments we have secured suf-

ficient information to warrant us in believing that six dollars per dry ton will cover the cost of dewatering and shipping the material to Chicago, including overhead charges.

Estimating the average value of the marketable sludge to be \$12.00 per ton, there will be a profit of approximately \$3.00 per million gallons of sewage treated.

I appreciate that these are estimates only and the public will look upon them as such, and while we in Milwaukee are much concerned in getting all the profit possible from the sludge, we are primarily more concerned in finally disposing of the sludge without nuisance even though no profit is realized.

That the sludge is valuable as a fertilizer has been physically proven by Dr. Edward Bartow, Director of Illinois State Water Survey, in his laboratory at the State University, where he made several pot cultures of wheat and garden vegetables according to the standard method employed by the United States Agricultural Department.

Dr. Bartow described his experiments in a paper presented at San Francisco before the Convention of the United States Society of Chemical Industry, from which the following information is extracted by the doctor's permission.

Each pot contained an equivalent of five tons per acre of dolomite, one-half ton of bone meal and 500 pounds of potassium sulphate. That is all the constituents of plant food except nitrogen.

Pot No. 1 contained no nitrogen.

Pot No. 2 contained dried blood equivalent to 120 pounds of nitrogen per acre.

Pots 3 and 4 contained the equivalent of 120 pounds of nitrogen per acre, or one ton of sludge per acre.

Thirty wheat seeds were planted in each pot. In ten days the plants were five inches high and at the end of 18 days each pot was thinned to 15 of the best plants.

A noticeable difference was observed after 23 days. The pots fertilized with the sludge grew much more rapidly than any of the others. The difference at the end of nine weeks was very marked.

Judgment of the results of such an experiment depends upon the crop. Pot No. 1, containing no nitrogen, produced a yield corresponding to 6.2 bushels to the acre.

No. 2, containing dried blood, produced 13.6 bushels per acre.

Pots 3 and 4, containing activated sludge, produced 35.9 and 37.7 bushels per acre.

The speaker has gone into the sludge question in considerable detail because of the doubt expressed by so many interested parties that the sludge can be successfully disposed of. There is great reason for this doubt because in no other artificial process of sewage disposal has it been possible to dispose of the sludge without expense and growing nuisance.

Two of the important features which appeals not only to the engineer, but to the average layman is the low first cost of installing the activated sludge process and the high standard effluent procurable.

So far as the speaker knows the only artificial process which produces an effluent at all comparable with the activated sludge process is sedimentation, followed by percolating filters and final sedimentation with sterilization.

The first cost of the activated sludge process is practically the same as the first cost of sedimentation tanks of the Imhoff type of like capacity. The cost of the percolating filters, final sedimentation and sterilizing equipment must be added. This cost is approximately \$14,000.00 per million gallons of sewage treated. This adds largely to the overhead charges. In addition to this the cost of sterilization must be considered. We have found in Milwaukee that it costs \$2.50 per million gallons to sterilize the effluent from an 8 feet deep sprinkling filter to the same standard of bug removal as secured by the activated sludge process.

The activated sludge process requires one acre to treat ten million gallons, whereas the sprinkling filter process requires five times as much. Available lands in or near a city are expensive, and this additional cost must be considered.

From the speaker's viewpoint there is no question of the great economy in building the activated sludge process when a good quality of effluent is required.

Another important feature which must not be lost sight of when considering a disposal plant for our northern climates which is the effect of zero weather. Sprinkling filters cannot be operated economically, or even satisfactorily through our northern winters. The activated sludge process can be added a little more air and a slight additional detention period.

ONTARIO MEDICAL ASSOCIATION PRESIDENTIAL ADDRESS

H. B. ANDERSON, M.D.

IN ACCORDANCE with the constitution of the Ontario Medical Association, it is the duty of the president to address the annual meeting, setting forth the condition of the profession in the province. The difficulty confronting one at this time is not to find topics suitable for discussion, but rather to select from among the multitude of important matters which suggest themselves, those of most immediate and pressing interest, and attempt to consider them with due regard to their relative importance. While I deeply esteem the honour of having been elected to the presidency of this association, one cannot but appreciate the difficulty of doing justice to the position, or of rising to the responsibilities and opportunities of so critical an occasion in our national and professional history.

We are meeting at a time pregnant with the most momentous issues since the dawn of the Christian era, under the shadow of the greatest calamity in history, with our Empire and her Allies engaged in a death struggle to uphold the cause of freedom and justice against a military despotism, which in the guise of Kultur, is seeking world power with the ethics and by the methods of the barbarian.

Those who have admired, perhaps too highly, German learning, scientific achievement, energy and genius for organization, have lived to see all of these directed by an ambitious and cruel autocracy, abetted by subservient professors, clergy and publicists, and prostituted to the basest of material ends. As members of a profession which has acclaimed German discoveries that have saved thousands of human derelicts, we must hereafter charge the autocratic system which encouraged their scientific achievements, with the subordination of all the resources and capabilities of the nation to an aggressive war, which has led to the slaughter of millions in the flower of manhood;

and reflecting on this we shall in future be more appreciative of the blessings of democracy, even with its attendant muddling and inefficiency. Well may we pray to be delivered from the blessings of Kultur and efficiency if they must be acquired by the sacrifice of freedom, of honour and those principles of religion, ethics and morality which have served in the past as standards by which men and nations are judged.

In the presence of these great events monopolizing the attention and absorbing the energies of our people, all other interests fade into insignificance. And yet we must not neglect "the daily round, the common task," as we look with confidence beyond the present struggle, but prepare ourselves in every department of our national life for the stern competition of the period of reconstruction and advancement which will inevitably follow.

On this occasion we miss the familiar faces of many of our colleagues who in answer to their country's call, are now on duty overseas, in the Motherland, in Flanders, France, Greece and Egypt, and we are proud of their record. "The members of the Canadian Army Medical Corps," as recorded by the official historian in describing the battle of Ypres, "rivalled in coolness, endurance and valour the men of the battalions who were their comrades."

Important duties also have fallen to those who are left behind, in organizing and manning the medical services of units preparing for active duty; in ministering to the medical necessities of the dependents of our soldiers, and not least, in giving their services for the restoration to health and usefulness of the sick and wounded who are returning from the front. The burden cheerfully undertaken by the medical profession of Canada has

been a heavy one, and we believe has been creditably borne.

I feel assured indeed that I express the feeling of every member of this association in saying that we regard it not only as a duty but a privilege to do what we can toward the restoration to health and usefulness of our brave countrymen now returning, whose heroic deeds have won imperishable fame for themselves, and shed enduring lustre on our country. To them Canada may fittingly apply the words of the poet of the Yukon:

"I will not be won by weaklings, subtle, suave and mild.

But by men with the hearts of Vikings and the simple faith of a child;

Desperate, strong and resistless, unthrottled by fear or defeat,

Them will I gild with my treasure, them will I glut with my meat."

An unusual feature of the present meeting will be the military session arranged with the collaboration of the Military Hospitals Commission and the officers of the Army Medical Corps in this district. While there will be a number of papers on radical topics of present military interest, the chief purpose of the session will be a discussion of the "invalided soldier problem" in all its bearings, so as to bring before the doctors of the province the importance of the question and the aid which they can render toward its solution. That our efforts so far are not unrecognized is evidenced by a letter recently received from the chairman of the Military Hospitals Commission in which he says "that the Government of Canada is indebted to the Ontario Medical Association for its interest and to the medical profession for the splendid spirit which they have shown."

If our deliberations assist in co-ordinating the military, medical, vocational and employment aspects of the situation, and in evolving a more efficient and uniform system of management in the various Military Convalescent Hospitals and subsidiary institutions, an important object will have been attained.

The war has brought us many disillusionments, has impressed many stern lessons, given us a wider national perspective, a keener vision of the responsibilities of citizenship and stimulated a whole-

some spirit of sacrifice to the common good. Those who have seen the beneficial influence of military training on the development of the physique and discipline of our young men, whatever may be their views regarding compulsory service, are unlikely hereafter to overlook the advantages to the nation, not only in a military but in a material way, of compulsory military training. A properly trained and disciplined manhood will not only increase individual efficiency for civil duties, but will go far to solve the problem of national preparedness.

We are indebted to Professor Blackader for having brought forward another lesson of the war, viz., the question of drugs and medicinal agents from the national, economic and professional standpoints, a matter which should receive the serious attention of the association. Who can estimate the influence on the present war of the amazing lack of foresight which permitted Germany to appropriate to her advantage the discovery of the aniline dyes by Sir William Perkins? This one shrewd deal added a billion dollars a year to the national wealth of Germany, increased immeasurably her scientific prestige, gave her first place in the world's trade in drugs and dyestuffs and assured her early in the war the advantage in high explosives. The responsibility for so great a blunder does not rest upon our profession, though we must admit that no feature of the centrally organized and far-reaching system of pan-German propaganda has been more successful than the exploitation of the university men of other countries in the interests of her campaign for military and commercial supremacy. No one will be disposed to speak lightly of the value to medicine of the scientific output of German laboratories, though we may properly plead for a more discriminating judgment in separating the wheat from the chaff, and especially for a less complacent acceptance of the literature of German commercial houses as the gospel of science.

Neither should we recognize a dual system of medical ethics under which state-controlled professors in German clinics may advertise in text-books and trade literature patented or trade-marked preparations, in a manner contrary to our

code, nor should we allow ourselves to second their efforts by prescribing those products as if there was some peculiar virtue attached to all things medical emanating from the Fatherland. Now, when the spell of the superman is broken, when even our academic Olympians, beguiled by flattery or tempted by self-interest, are perhaps aware of the true inwardness of German intrigues, and when those who control our universities are awakened from their dreams of an era of scientific advancement under the direction of Exchange professors approved by the Prussian Ministry of Education, will be an opportune time to consider more sympathetically the rights, interests and scientific possibilities of our own people.

More especially should we oppose the sale of common drugs, marketed in fancy packages under fancy names and at fancy prices. Some of these abuses can be controlled by legislation; some by a stricter adherence to our ethical code, or if necessary, by revising it so as to be fairer to our own manufacturers; much can be done by an educative campaign, not only for the benefit of the medical profession but the public, to make known the kind of competition we have to face and the best means of meeting it; and perhaps most important of all, by our medical schools giving to students a more thorough grounding in practical therapeutics, such that they may not be left after graduation to be instructed in the use of drugs by the literature and agents of manufacturing chemists. The medical and pharmaceutical professions should be more closely in touch with the manufacturers and exercise more control over their products, by encouraging their legitimate activities and enlisting their assistance in supplying real professional needs. I am fully convinced that a more sympathetic co-operation should replace the present aloofness of our professional and scientific men from manufacturing and commercial interests, and that this could accomplish much for the benefit of all concerned. The medical profession should learn, however, to place its dependence on the carefully appraised preparations in our national pharmacopœias, which should contain all really useful remedies, rather than in the commercial-

ly-biased catalogues of drug houses, with their too frequent irrational polypharmacy. Other countries should not forget that in Germany everything is subordinated to military efficiency and that in supporting ever her legitimate activities, they are contributing to her aggressive designs.

In the task before us we should cultivate a self respecting national spirit, avoiding equally the attitude of the superior cosmopolitan,

"The sturdy patriot of the world alone,

The friend of every country but his own;"

and the reverence for antiquated inefficiency and smug self-confidence which at times parade as patriotism. Neither should we be so blind to our own interests as to neglect to profit by the lesson Germany has given us of the necessity for laborious study and investigation, of strenuous and concerted effort, scientific organization and co-ordination of national aims, and the value of their direction by experts in the different spheres of activity.

Turning to matters of local interest, the most important are those being considered by the Commission on Medical Education, appointed last autumn by the Provincial Government. It is expected that the report and recommendations of the Commission will be made the basis for legislation which will settle many important questions that have been pending for some years.

Foremost among the questions being considered are all matters relating to education for the practice of medicine in the province. Recent years have witnessed a rapid evolution—the passing of the old proprietary schools, the lengthening of the course of medical study, the addition of many full time professors to the teaching staffs of our schools, the extension of laboratory facilities for the teaching of the fundamental sciences, the beginning development of libraries and the erection of commodious hospital buildings. As in other parts of the English-speaking world the course of events with us has been influenced by the reports on medical education of the Carnegie Foundation and the Royal Commission of the British Government. The contention on pedagogic grounds

that medical education should be considered an educational rather than a medical question, thus separating teaching more widely from practice, the movement for the appointment of full time professors in the clinical departments and the far-reaching schemes of Germany to create centres of propaganda in our universities by means of Exchange professors, have all been lively topics of interest.

In the midst of this evolutionary unrest the outbreak of the war has added to the confusion, and the most sanguine would scarcely claim that a satisfactory conclusion has yet been reached. Thus far we appear to have adopted a compromise between the British and continental systems, incorporating the worst features of both and the advantages of neither. The clinical branches in our hospitals still suffer from the lack of laboratories, properly equipped and manned for the study of the problems of the wards. Those having the interests of the future of clinical progress at heart, however, confidently expect the fulfilment of the promise of the Government that the Enquiry will be an exhaustive one, that all interested persons will have an opportunity of expressing their views, and that the report passed thereon will remove many defects in our present system of organization.

The position taken by the representatives of the Ontario Medical Association and other medical organizations, regarding the legislative recognition sought by osteopaths, chiropractors and other cults, upholding the principle of a uniform standard of education and examination for all who wish to practice medicine in the province, is well known, and calls for no special reference on this occasion.

Never in the course of history has there been such a demonstration of the national importance of a thoroughly trained medical profession as during the present war. The service which scientific medicine has rendered in protecting our soldiers against typhoid fever, dysentery, cholera and other scourges of armies, has saved tens of thousands of lives and trebled military efficiency.

Ask our wounded soldiers who have been made oblivious to suffering during operations under ether or chloroform, or

whose pains have been eased by morphia, what they would think of "drugless treatment" at the front? Should our colleagues then, who under danger and privation are rendering such services, at great personal sacrifice, have their interests at home unnecessarily jeopardized by the granting of special privileges to the uneducated or poorly trained output of foreign proprietary institutions, that are unable or unwilling to meet the requirements for preliminary education and professional training, exacted of the graduates of our own and other recognized universities? Let us remember, however, that it is not sufficient that we ourselves are assured that we seek only what is just, and in the public interest; we must be prepared to defend our cause, keeping in mind the words of Sir Thomas Browne "that a man may be in as just possession of Truth as of a city, and yet be forced to surrender" if unprepared to back up his principles by intelligent action.

It would be well at this critical juncture in our professional history to recall the chaotic condition of medical affairs which existed in the province prior to the organization of the College of Physicians and Surgeons in 1866. At that time the public clamor for protection against the prevalent quackery, forced the Government to take action, and the universities and different medical bodies to unite in establishing a representative institution of the profession to control the curriculum, examination and practice of medicine in the province. The lapse of time, and the criticism frequently directed against the management of our affairs by the College of Physicians and Surgeons, has caused some to forget too readily "the pit whence we were digged" and the large amount of valuable constructive work which we owe to that body. The medical profession of the province should be slow to admit its own incapacity for self-government. For this reason I believe the movement to make the medical degrees of our universities qualify the holders for the right to practice, is to return to a system which has proved a failure in the past and from which the universities, the profession and the public at large all sought deliverance. We should, therefore, endeavor to maintain the "en-

tente cordiale" and to co-operate for the general good, rather than by magnifying differences, cause a cleavage between the universities and the profession and thus leave ourselves more vulnerable to attack by the enemies of medical progress.

The adjustment of difficulties arising out of the present duplication of examinations should be possible without such radical changes as would endanger the rights and privileges of self-government now enjoyed by the medical profession.

In some of our universities, the non-clinical departments, those having in charge the fundamental scientific and theoretical rather than the practical aspects of the training of students, it is well known exercise a preponderating influence, and clinicians and practitioners alike should view with misgiving any tendency to place the control of the profession more fully in the hands of those, who neither by training, experience nor circumstances, are closely in touch with the requirements for efficient practice.

Another live topic for discussion at present is the administration of the Workmen's Compensation Bill. This law has now been over a year in operation, and has occasioned much dissatisfaction and resulted in many protests from medical practitioners, who have been either inadequately remunerated or unpaid for their services. The injustice of the bill has not yet been fully experienced, because many manufacturers still pay the medical attendant for his services to employes, as they did before the inauguration of the present law.

It is satisfactory, however, to state that both the Compensation Board and the Government, aware of the experience elsewhere, that the hearty co-operation of the medical profession is essential for the success of the scheme, have shown a willingness to consider fairly the grievances complained of and to adjust matters on a more equitable basis. The failure to pay properly for medical attendance has naturally resulted in a large surplus in the first year's operation of the scheme, which makes it imperative for us to press for fair consideration at this time. It would be regrettable if any avoidable friction arising from a sense of injustice

should impair the usefulness of a progressive and necessary measure.

The question of medical fees, a subject of perennial interest to both the public and the profession, is one of the matters being considered by the Commission on Medical Education, and I may therefore be pardoned for referring to it. Whatever truth there may be in the complaint against excessive fees charged in individual instances, it may be stated without fear of contradiction that the remuneration of the great body of practitioners has not begun to keep pace with the expense of acquiring a proper medical education and the increased cost of living in the province. A comparison with tariffs published in Toronto in 1839 and 1886 will prove that in many cases fees are actually lower now than at those periods. Nor have ordinary medical fees increased in proportion to the cost of maintenance in the public or private wards of hospitals. One cannot but sympathize with the burden imposed on people with moderate incomes, in procuring proper medical and surgical attendance, hospital accommodation and nursing under present conditions, but the fault lies with the other developments of modern practice more than with the doctor.

It is well known that no body of citizens has labored so unremittingly for the promotion of preventive medicine and the public health, regardless of their own financial detriment. The medical profession also has borne without complaint the burden of attendance on the indigent sick, and too frequently as well on impostors, who pass as such, in order to escape their financial obligations. We may justly claim that mercenary motives have always discredited a man in the eyes of his professional colleagues, and that he who would make the acquirement of gain the chief object of his calling would be well advised to seek another field for his labors.

In no class of illness is the financial hardship so apparent as in the management of nervous and borderland psychopathic cases, in which the usual prolonged duration, the necessity for constant attendance of nurses and the procuring of suitable accommodation, often tax the resources of the family to the utmost de-

gree. I believe that general experience warrants the statement that one of the most urgent needs in the province at the present time is the provision by the Government of suitable accommodation, at a moderate price, for the proper control and treatment of borderland nervous cases, incipient or temporary insanity, inebriates and drug habitues.

The complaint is heard occasionally among our more prosperous citizens that, like the butcher and the baker, the doctor should charge the same fees to rich and poor, but if they would recall the fact that the poor to a considerable extent receive free treatment, the impossibility of adopting such a rule will be obvious.

I hope I may now be pardoned for referring to something more in the nature of a family affair, viz., the disproportion between the remuneration of the surgeon and specialist as compared with the physician and general practitioner. This is freely admitted by all, and the opinion was embodied in a report adopted by the Ontario Medical Association a few years ago. This disparity is undoubtedly one of the causes underlying the pernicious custom of fee-splitting, by which less scrupulous members of the profession arrange a secret adjustment of the difficulty; a practice we believe never very common in this province, and of which happily even less is heard in recent years.

There seems no good reason why the present inequality should continue. The basis for remuneration of physician or practitioner and surgeon in a case, should be the relative value of services rendered. The present custom, in cases requiring surgical operation for their relief, tends unduly to exalt the mechanical or technical phase of the operative procedure, and to minimize the importance of the preliminary investigation, the diagnosis and the after treatment. This is certainly not in the interests of either medical or surgical progress. The properly trained practitioner or physician to whom the patient first applies for relief, should be the one most competent by training as well as circumstances, to direct the latter aspect of the procedure, recalling the surgeon for consultation if in his judgment the interests of the patient require it.

Under such a plan it could be arranged to have the fee charged in a given case cover the whole procedure of preliminary investigation, diagnosis, operation and after treatment, and the remuneration of practitioner and surgeon determined by a previously considered and established value attached to each part of such a procedure. Under all circumstances the interests of the patient should be considered of first importance; there should be no secrecy, and the relative remuneration of each attendant should be determined by the services actually rendered and in accordance with a generally accepted rule. I suggest this merely as a possible equitable and ethical basis of adjustment in keeping with the interests of the patient, and fair alike to medical and surgical attendants.

In reviewing the present condition of medical affairs one cannot overlook the nursing problem, which is one of increasing difficulty, especially in private practice. Training schools for nurses connected with hospitals throughout the province have accomplished admirable results in raising the standard of training and supplying highly qualified professional nurses.

One must regret, however, a tendency, especially among recent graduates, to limit their professional work to hospital or other selected practice, where the work is easier, rather than to answer the call of duty wherever it may be. This is not in keeping either with professional ideals or a correct sense of duty, and if continued, will assuredly tend to lessen the usefulness of the nursing profession and lower it in the public esteem. It is a custom which should be discouraged alike by hospitals, training schools and the profession at large. I would suggest a lower scale of fees for those who will undertake only selected work, as a practical means of remedying the difficulty.

Important progress in the domain of public health may be reported during the past year. Through the generosity of Col. A. E. Gooderham, the Department of Hygiene of the University of Toronto has been enabled to undertake the manufacture of various antitoxic sera and vaccines, and by the enlightened and public-spirited action of the Provincial Government, ar-

rangements have been made for the gratuitous supply of these products to the profession. In this way there will be placed more readily at the disposal of medical men the means provided by modern scientific investigation of dealing with different infective diseases.

It is also worthy of note that a local manufacturing company is now furnishing a product—diarsenol—which experience has shown to be a satisfactory substitute for diarseno-benzol. The commendable attitude of scientific and clinical men of the University staff in promoting this enterprise stands in pleasing contrast to a lack of encouragement heretofore frequently complained of, and we trust marks the beginning of a new era in the evolution of a policy of general application, rather than being merely one of the vagaries of the fairy godmother.

In order that we may be able to bring the corporate influence of the profession to bear in maintaining the status of medical practice, in directing aright the many problems now in course of adjustment, and in guaranteeing to the people the increasing benefits of modern practice, it is essential that we be well organized. I am glad to report that much progress has been made in this direction during the past year, and that we now have a fairly complete provisional organization throughout the province. Thirty-five local city, town or county societies are at present in existence, and ready to affiliate with the Ontario Medical Association. A provisional constitution has been drawn up to be submitted for the consideration and approval of the association. There is still in some quarters a remarkable apathy on the part toward the profession regarding matters of crucial importance, but signs are not wanting of an awakening, which it is the duty of this association to hasten.

We are pleased to have with us on this occasion the Executive Council of the Canadian Medical Association, and trust that our combined meeting may help to remove misunderstandings and to strengthen the bonds between the two associations.

May I also express to our distinguished American visitors the great pleasure their presence affords us, and how much we appreciate the readiness they have shown to contribute to our program, especially at a time when we are handicapped by the

absence of so many of our own members. We take it as a further evidence of the feeling of kinship, common interest and sympathy existing between our countries, and which is so happily marked this year by the celebration of a century of peace.

It may be of interest to you gentlemen from the neighboring Republic to know that there is now in this city a regiment of 1,100 of your countrymen, preparing to enter the fight to uphold those principles of freedom and justice, dear alike to your country and our own. We in Canada share a common belief that, after the war, the great centre of scientific medical interest and activity will be on this side of the Atlantic—American in the widest application of the term—and those who have watched the wonderful progress which medical science has made in the United States in recent years, will have no misgivings as to your qualifications for leadership.

To our fellow countrymen who have come back after winning distinction in medicine under another flag, we extend a hearty welcome. You will not find the Canada you left a few years ago, the Canada of to-day, but a country chastened by recent experiences, conscious of great responsibilities, purged of many faults, yet quickened in every fibre of her national life, proud of her sacrifices for the Empire and humanity, and confident of her future.

It is a part of our national creed that what the 19th century was to the great neighboring Republic, the 20th century will be to Canada.

The foundations of medicine in Canada were laid a century ago by the army surgeons who saw service in the wars against Napoleon, and we may look for a similar influence in our further evolution, to be exerted by those of our number now in service in the greater struggle against the Kaiser. The spirit of freedom and love of liberty which has called them to duty overseas will return with them, accentuated by their experiences, to withstand injustice and tyranny from whatever quarter it may appear, to oppose weak submission to wrong and to assist in promoting a worthy national sentiment.

In conclusion may I express to my fellow officers of the Ontario Medical Association my deep sense of obligation and gratitude for the loyal support and co-operation accorded me in arranging for this meeting.

THE MARRIED WOMAN IN INDUSTRY*

By JOHN MARTIN

(The third in a series of articles on *The Four Ages of Woman*, in which Mr. Martin sets forth a "programme of humanism" in opposition to what he regards as socially destructive phases of the feminist movement.)

SHOULD a woman resign her wage-earning position when she marries?

"No, emphatically no!" answers feminism. "She must preserve her hard-won independence. She can add conjugal love to her life; but never must she allow love to supersede earning. By continuing at lucrative work she can hire experts to do her household duty and, exempt from the drudgery of cooking, cleaning, sewing and serving, she can realize herself in her occupation and swim in the great current of the world's life. Not only should she keep up her vocation after the wedding, but she should endeavor to make it legally impossible for any employer to bar her from factory, school or office on account of matrimony."

The Legislature of Western Australia has made it a crime punishable with imprisonment for three months or a fine of \$2,500 for any employer either to dismiss a work-woman or to reduce her in grade when she marries. That is the logical climax of industrial feminism, of the ideal "every woman at work for wages." If the dependence on husband is a disgrace, and the earning of her own bread a precious right which every mother should cherish, then no employer should be permitted to deny her that right.

This doctrine, dinned into the ears of bright, ambitious college girls deflects their minds from home-making and often turns the balance against it. But working women by the ten thousand who toil for wages of five to ten dollars a week, are not prone to this deception. They look forward to marriage as a release from drudgery. They expect the husband's

wages to be handed to them for disbursement, regarding their work in home-making as their full and sufficient contribution to the joint menage. That their economic service in the home is fully as valuable as in the factory they know without elaborate demonstration, because if they are to pay for suitable help, according to feminist directions, every cent of their slender earnings will be paid to the "suitable help" who, even then, will do far less for money than they themselves for love.

Such women, the real wage-earners, know from their own bitter experience, as humanism recognizes, how hurtful to health and well-being is the industrial employment of women. To this harmfulness whole libraries of evidence have been given by doctors, factory inspectors, investigators, sociologists and officials of every grade. As to the effect on the worker herself, a British factory inspector says:

"In weaving rooms and other places where women are obliged to stand at their work, varicose veins are more than commonly frequent and, naturally enough, occur more frequently among the married women" (Fatigue and Efficiency, Josephine Goldmark, page 122).

Early in life the damage has already appeared. "The witness has lived in twenty factory towns and has observed that young women who work in the factories are many of them ruined in morals and nearly all in health. A rosy-cheeked girl put in a mill will begin to fade in three months" (Ibid., page 132). A high price surely to pay for initiation into industry. A doctor testifies that "40 per cent. of married women who have been factory or shop girls come under medical attention for pelvic troubles, under thirty years of age" (Ibid., page 135).

Of this penalty for partial "economic independence" feminist arguments give no hint. And such penalties are rarely escaped by the women who work as ninety-

*Reprinted from the Survey.

nine out of every hundred women who seek "economic independence" must work.

Even if she do not marry, the woman cannot escape the penalty of her sex when exposed to the strains of industry.

"The unmarried as well as the married woman is subject to the physical limitations of her sex and each suffers alike from those incidents of industrial work most detrimental to the female reproductive system, such as overstrain, from excessive speed and complexity, prolonged standing and the absence of a monthly day of rest" (*Ibid.*, page 40).

Employments that do not require constant standing and are quite "genteel" in character yet bring their own special harm to women workers. Universally girls are employed as operators at telephone switch boards. Smartly dressed, intelligent in feature, sifted and trained in special schools, better paid than most girl workers, these telephone operators, with "the voice with a smile that wins" to whose prompt "Number, please?" we are all accustomed, are not usually brought to mind when the distresses of female wage-working are considered. Yet a Canadian Royal Commission aided by twenty-eight physicians reported (Senate document, No. 380):

"In our opinion a day of six working hours. . . is quite long enough for a woman to be engaged in this class of work if a proper regard is to be had for the effect upon her health."

But the average hours of work in the United States is eight and one-half per day. Far from a six-hour day, a case of thirty-nine hours' overtime in two weeks added to a regular nine-hour day "is not an exceptional case. Many other girls are working as long hours." Women in industry must sacrifice themselves to the business. The business will not sacrifice itself to them; it will exact the last ounce of strength. "It is safe to say that the breaking point of the operator's health is not far from the breaking-point of efficient work," says the report.

So it goes. In England, in Germany, in France, in Canada, in the United States—wherever eyes have been opened to look clearly on the effect of wage-earning on woman's vigor and enjoyment of life, the

same dismal tale of sickness and premature death is told. However, with increasing frequency girls in offices and stores and social work, the cleaner and lighter occupations, tend to stay at work after marriage, at least until handicapped by the coming of a baby. In this case the woman does double duty as provider and housekeeper.

The young couple start with light housekeeping in which John is expected to help Mary by lighting the morning fire, wiping the dishes and sharing in the heavy furniture cleaning. Of this, in his masculine selfish way, he presently tires. Always the tendency is for more and more of the housework to fall exclusively on the woman. She does it more handily; it seems "natural like" for her to undertake it; the bliss of love's young dream, so vivid during the courtship, when he found his greatest delight in joining with her in any work that gave a chance for a hand-touch and a stolen kiss, begins to fade, and presently the traditional function of woman in the home is added to her self-retained new function of provider for the home.

Theory fails against age-long custom and natural fitness. Her hours at the office are the same as his. Together they may start off in the morning and return in the evening; but before she goes she must get the breakfast and plan the evening meal and when they return there is the meal to be cooked, table to be laid, dishes to be washed and dusting, cleaning and furbishing of rooms to fill the evening. Unless she succeeds in smothering all her feminine instincts she will be more eager to make the rooms into a domestic nest than she was to turn her single bachelor hall-bedroom into an abiding-place.

So Mary works while John reads the newspaper and smokes. Inevitably she is overloaded. Marriage has brought him a cozy place of his own in which to rest and refresh himself after the day's fatigues; but she has found an additional burden, lightened indeed by love and by her joy in the fulfillment of woman's desired destiny—the creation of a nest of her own, but yet of necessity an additional drain on her vitality, an added pull on her elasticity that may destroy its resilience.

"But," the feminist will exclaim, "why doesn't she hire a woman to come in while

she is away during the day and clean up everything, lay the table for love's cozy supper, have the lamps lighted and the curtains drawn against the mistress' return and everything beautifully arranged so that Mary, like John, can read the newspaper and smoke her cigarette the livelong evening through?"

For cogent reasons. After Mary has paid out of her very moderate salary for her carfare and her lunches, for the neat shirtwaists and hats in the fashion which her smart situation demands, for her laundry and other expenses incidental to her work, so little is left as her contribution to the household for food, rent, light, insurance and saving, that she does not see how she can give some other woman \$6 a week to do her housekeeping for her, even if she can find a trustworthy, capable person who for a dollar a day will not break and waste more than the worth of her service.

No! the feminist substitute for the wife's work in the home—that some other woman shall do it—presupposes an income which the wife rarely earns.

In the very exceptional cases of women of extraordinary talent who, fitted in industry with the exact work that suits them, are able to earn \$3,000 a year and more, enough may be allotted to buy the services of the paragon housekeeper and maids to work under her, so that the mistress can be spared any drain on her strength when she returns from her lucrative day's work.

But, even then, other difficulties make this system of going in double harness, wife and husband pulling an equal share of the economic load, impracticable as a usual mode of life. Suppose either man or woman by the common exigencies of their business must remove to another city. What then becomes of the double-harnessing? Which shall control? Shall he go with her to enable her to establish herself afresh, or shall she break her business connections to stay with him? "Whither thou goest I will go," has been the loving pledge of the wife in the patriarchal family because the necessities of the family compel the father to follow his business opportunity wherever it leads; but loyalty to her career will clash with loyalty to her husband. Which shall then conquer?

I knew one lovely young feminist whose hopes came to wreck on just this reef. She was an able and enthusiastic labor agitator, hailing from England, who found congenial and well paid employment in America. But before entering this sphere she had shown the weakness to fall in love with an Englishman whom, in the expectation that her career need not be broken, she shortly afterward married. However, the husband, unable to discover suitable employment in America, went to a good berth in South Africa, explaining that "I didn't demand that my wife should give up her career, but I never had any idea of giving up my own."

With this geographical separation what arrangement could be reached? Could two hearts on two separate continents continue to beat as one? Man-like and Englishman-like, he expected his wife to follow him. At first she was recalcitrant, for she was saturated with feminist theory. After a few months of dallying she was offered the alternative of complete union or a complete rupture of communication. She really loved her husband—a contingency for which feminism does not provide. So a prolonged famine of letters from hubby reached her feelings, and she finally sacrificed her work to her marriage vows.

All these mundane obstacles, however, are of trifling importance compared with the peril of the central assumption of this *menage a deux*, an assumption most repugnant to humanism, that there shall be no early fruit of the marriage. Society's prevailing arrangement is based on the opposite expectation. Civil Service rules and the rules of boards of education which require the resignation of a woman employe when she marries, are drafted on the moral and humane assumption that married couples will have babies and that the first conception will occur, on the average, not many months after marriage.

But that assumption is becoming old-fashioned and obsolete. As is demonstrated by the agitation against the retirement of women teachers, doctors or civil servants upon marriage and is verified by the Western Australian law that forbids any employer to dismiss or demote a woman upon her marriage, feminists resent the implication that any physiological disabil-

ity for the full discharge of their business duties will follow upon their marriage. And, in truth, as we have shown in another chapter, the college and professional and business woman knows how to keep any maternal longings under the strictest control and to outwit Dame Nature's devices.

Feminism would supplant instinct by thrift and strike out of the marriage service all reference to the Biblical injunction to "be fruitful and multiply and replenish the earth." It challenges society to alter its fundamental assumptions about the consequences of marriage and to base industrial employment for women on the presupposition that maternity, if not entirely avoided, will at least be effectively regulated by the law of economic independence for women. Society has been organized, hitherto, on the humanist assumption that the operation of instinctive impulse was so dependable and its consequences so inevitable that the woman would, shortly after marriage, be incapacitated for strenuous outside activity and should therefore upon marriage resign that activity.

Feminism challenges society to revise that common expectation, to recognize that mating need not mean maternity and to rearrange the rules of employment so as to approve and encourage the feminist in her subordination of maternity to money-making.

Not, however, that all feminists approve of completely sterile marriages. A child is necessary to the woman, argues the feminist, for her complete self-realization; therefore, she must not permit even her economic independence to sentence her to maternal sterility. But neither must she permit the baby to sentence her to economic dependence. She should not resign her vocation on marriage because marriage implies a baby, since, even with a baby, she will not need to resign her vocation. That brings us to the question of the mother in industry which must next be considered.

(In the next instalment Mr. Martin will take up The Mother in Industry.)

THE Fifteenth Annual Convention of the Canadian Association for the Prevention of Tuberculosis will meet in Quebec City, September 12th and 13th, just previous to the meeting of the Canadian Public Health Association. An excellent programme is assured and a cordial invitation is extended to all to be present.

THE PERIODIC MEDICAL EXAMINATION*

By DR. GEORGE ELLIOT, M.D., Toronto

Mr. President and Gentlemen:

NEVER before in the history of the world has there been such awful wastage of human life; and never before have there been so many movements to conserve human health and human life. The former began about two years ago; the latter, about twenty. Fraternalists are spilling their blood upon European battlefields for humanity and civilization. What are they doing at home to conserve human health and human life?

"Protection to the home" is the tonic of fraternalism. Canadian fraternalists have gone overseas to do their part in protecting our homes from devastation at the hands of a ruthless, savage, and barbarous devil of militarism. That is the way to prevent the enemy battering at our own gates. Is it not better, too, to protect ourselves from the unseen enemies of mankind, the germs and the bacilli, before they sneak into our physical strongholds? An ounce of prevention is worth a pound of cure! Let us, then, begin to protect our homes by staving off disability on account of sickness, old age and accident. The aim and object of fraternalism should be to keep the breadwinner capable as long as possible, and so delay the payment of benefit and mortuary insurance. This is based upon humanitarian, intelligent and sound business principles.

But where are some of the concrete instances of the results which have been accomplished in the conservation of human health and human life? Whilst many examples might be given, one near home and fairly well known may be mentioned somewhat in limited detail.

Up to about twenty years ago, the deaths from tuberculosis in the Province of Ontario increased annually, until they had reached a total of over 3,400 in one

year. Then began the campaign for the prevention of this disease; and without reciting what has been done, it is sufficient to state that year by year they have been decreasing, until they now stand at 2,200 per annum. It will not be too much to expect that, if the progressive campaign is continued, tuberculosis will be practically wiped out in the Province of Ontario within another generation. To-day Ontario has one sanatorium bed to 2,403 of the population and stands first amongst the Provinces of the Dominion in the matter of provision for cases of tuberculosis. Manitoba comes second in the matter of provision; and it is significant that Ontario and Manitoba lead the other provinces in the decline in the death rate from tuberculosis. In those provinces where there is little or no accommodation, the secretary of the Tuberculosis Association tells us there has been no decrease in their tuberculosis death rate. Whilst it is not claimed that sanatoria have accomplished all this, they have materially influenced the treatment of tuberculosis; and the educative campaign toward the prevention of the disease has markedly lessened its incidence.

Any medical practitioner can recount cases of incipient or overlooked tuberculosis, Bright's disease of the kidneys with increased blood pressure, diabetes, cancer, supposedly cured syphilitics, menacing typhoid carriers, so-called cases of indigestion, etc., which come on insidiously, and are very often discovered by accident, through the patient presenting himself to the physician with some symptoms he quite frequently misinterprets.

Another striking and salient example of the value of the periodic medical examination may be drawn from the experience of the Board of Health of the city of New York. A little over a year ago, the department of public health in that city de-

*Presented to Medical Section, Canadian Fraternal Congress, April, 1916.

tailed a male and a female physician, on whole time service, for the purpose of making annual medical examinations of the employes of that department. It was not a compulsory measure. For the first examination over 600 men and over 1,000 women voluntarily presented themselves; some even presented themselves from other departments of civic government. In the report of these examinations detailed cases are given. Many were found to be in a condition of abnormal health, some even with serious insidious disease. They were advised to take treatment and return for re-examination. The re-examination a year afterwards disclosed a great majority of recoveries.

In all armies periodic medical inspection and supervision of health is now paramount. Soldiers are kept fit to fight. The Japanese blazed the way. Prior to their war with Russia, three and one-half men died from disease in the armies in the field to one slain by the bullets of the enemy. The bacilli were overwhelmingly victorious over the bullets. By the adoption of preventive measures, even going so far as to order their men to take baths before engaging in mortal combat, the Japanese reduced the mortality from disease in their army so that it stood as one to one of those slain in actual warfare or as a result of it.

Typhoid fever began to be the bane of all armies in the field about the middle of the last century. Amongst 250,000 British troops in South Africa, there were nearly 58,000 cases of typhoid fever with 8,022 deaths, and 19,000 invalided home; that from one disease alone to say nothing of the ravages of dysentery and pneumonia. Altogether in the South African campaign 8,000 died as the result of actual warfare.

In the Spanish-American War, the Americans sent into the Island of Cuba 117,000 non-commissioned officers and men. Twenty per cent. of them contracted typhoid fever, and 1,600 died.

In the present great war, from its beginning up to the 10th of November, 1915, there were only altogether amongst the British forces on the western battle front about 1,500 cases of typhoid fever. It has frequently been stated that it was unusual to see soldiers returning from the

trenches to hospital on account of disease; and the Under Secretary of State for War has frequently announced in the House of Commons that nothing like the way the health of the British forces has been conserved, has ever before occurred in history.

To what is this to be attributed? To inoculation to prevent typhoid fever; and to the very laudable work of the Sanitary Service Units, which practically take the part of a department of health of any civic government.

The results of inoculation are best seen in the experience of the United States army, an army which consists ordinarily of about 90,000 troops, stationed in various parts of the world. In the year 1908, the American military authorities sent two of their surgeons to England to study this great discovery of Sir Almroth Wright, the famous London physician. Upon their return, they began to put inoculation into practice, tentatively. Before that date it was the rule to have from 300 to 350 cases of typhoid fever in their troops every year. Their first results were so good that inoculation was made compulsory in the United States army in September, 1911. In 1912 they only had twenty-seven cases; in 1913, four cases; in 1914, three cases; up to the first of July, 1915, only one case.

Many fraternalists are drawn from the ranks of the industrial classes. Many are exposed to great dangers, suddenly, either through poisonous gases, vapors and fumes; or chronically, by slow and insidious absorption into the system, through the medium of the stomach, lungs or skin. Canada is so far behind the other countries of the world in the matter of dealing with the prevention of industrial, or occupational diseases, that our Governments, our people, and our fraternal societies should be heartily ashamed of the absolute neglect shown in this branch of public health. If the fraternal societies took hold of this matter and constantly and regularly pressed it upon the attention and consideration of governmental bodies they would be doing something worthy the name fraternal. For the sake of the fraternalists in industrial pursuits, leadership is wanted; and the Canadian Fraternal Association can point the way.

Members of fraternal societies need enlightenment upon a question so vital, as periodic medical examinations, to the "protection of the home." They must understand that human life is extensible, and that disease in many cases is largely preventable. There is no question of the value of the recurring medical examination which can detect the departure from the normal and the beginning of a chronic and fatal malady. It furnishes the opportunity to seek appropriate treatment from the family or lodge physician.

For several years the Association of Presidents of Life Insurance Corporations in the United States and Canada has had a well-organized public health bureau. They use their agents as a vast army in the public health campaign: primarily, to prevent disease in their policy-holders; secondarily, for the good of the community. Public health literature is issued and distributed. They are carefully considering the adoption of the periodic medical examination. Some, even, have already provided for it. If life insurance corporations, manned by keen and bright business intellects, can do this in the interests of policy-holders, and in the interests of increased dividends, fraternal societies cannot much longer delay in joining in this humanitarian and economic campaign, unless they choose to be considered stagnant, retrograde or following suit to the old-line companies' lead. Advertising like charity commences at home. The fraternal society which adopts some plan of periodic medical examinations advertises to its members and the public that it is alive and progressive, and stands to win in the race.

But it is not alone in life insurance that the periodic medical examination is being instituted. It has been introduced into the school, is being adopted in the office, in the factory, in the restaurant; for the home worker as well as for the unit and the group. Consider the engineer

who takes you upon a long journey! Watch him make a careful inspection of the engine, the trucks, etc.! There is no thought of waiting for the breakdown. Periodic inspection is given all along the route. Prevention of accident is the motive. And so in the factory there is periodic inspection of machinery. Man, however, endowed with the highest intelligence, drifts along and only seeks an examination of his "machinery" when some discomfort sounds a warning note.

There has been established in New York city an organization known as the Life Extension Institute, whose vocation is to bring to the attention of the general public early recognition of disease through the medium of the periodic medical examination. In their recent publication of tests, and comparisons made of the examinations upon 1,000 commercial employees, from banks and other houses with 1,000 employees of a large industrial establishment, it is most remarkable that in the two classes departures from normal health and physical defects were abnormally large. Of the industrial employees, not one passed a perfect physical examination. Their average age was 32.7 years. In the commercial class whose average age was 27 years, perfection of physique and health were found in one per cent. In the industrial class 69 per cent. were referred to the physician for treatment; in the latter, 81 per cent. Of those aware of their condition when referred to the physician, 10.15 per cent. were in the industrial class, and 11.54 per cent. in the commercial class. Is any better proof needed of the urgency of the periodic medical examination?

The human "machine" is of most value and does its best work when kept in good repair.

(N.B.—The Canadian Fraternal Congress unanimously adopted the Resolution of the Medical Section calling for the education of members of fraternal societies to the value of the periodic medical examination.—Ed.)

ANTI-TYPHOID INOCULATION IN SOLDIERS

By CAPT. GEORGE D. PORTER, A.M.C.

THE FOLLOWING is a brief report on the early results of 126,600 inoculations rather than a paper on the general subject of inoculation. It might be well to recall, however, that the excellent results which have followed inoculation in the British forces in India and elsewhere, and also in the United States army, have been largely responsible for its almost universal use in the armies of the world to-day. While sanitary measures in general have never been so closely observed as at the present time, yet the wonderful freedom of the troops from typhoid may be largely attributed to inoculation.

In Major Lelean's book on "Sanitation in War" he estimates that there are five and a half times as many cases of typhoid amongst the soldiers who are not inoculated and that there are ten and a half times as many deaths amongst those unprotected by inoculation as there are amongst those who have been inoculated.

Another report states that from August 1914, to November 10th, 1915, 1,365 cases of typhoid were reported from the front (1,150 verified by laboratory diagnosis). In 579 cases amongst the inoculated there were thirty-five deaths, while in 571 cases amongst those unprotected by inoculation, there were 115 deaths. Owing to our lack of information regarding the number of inoculated soldiers who contracted typhoid, and those not inoculated who contracted the disease, it is impossible to compare the results, but these figures do show that the mortality is less than a third amongst those inoculated. Another list of figures taken from one of the British Medical Journals, but unsigned, shows that in 1,347 cases of typhoid 891 had not been inoculated, while 225 had been. Of the 891 cases uninoculated there were 155 deaths, making 17.4 per cent. Of the 256 cases inoculated there were only 8 deaths, making 3.1 per cent. The mortality amongst those inoculated only once was greater than amongst those

inoculated twice, and the mortality amongst those inoculated twice was more than amongst those inoculated three times.

In reply to a letter for further information, however, I have received a letter from the office of the Director of Medical Services of the Canadian Contingents in London stating that "although the figures are such that they ought materially to help universal inoculation, the War Office refuses to allow any statistics regarding medical work to be published."

The technique used at the Laboratory in District No. 2 is to paint a small area beneath the clavicle with tincture iodine, and, after boiling the needles, syringes and plungers, inject subcutaneously one c. c. of the anti-typhoid vaccine which equals a dose of 250,000,000 dead bacteria. The second dose of the same strength is given from four to ten days later, and the third dose of double the strength is given from four to ten days after that, making in all 1,000,000,000 dead bacteria. It is important to have the bottles containing the vaccine well shaken before using, also to have the rubber stoppers painted with iodine before inserting the needles through them for withdrawing the fluid. Our vaccine is prepared at the Provincial Laboratory and must be kept in a cool place when not in use.

The redness and tenderness surrounding the site of inoculation which sometimes supervenes begins to subside in a few hours. As the constitutional reaction comes on about six hours after the inoculation, consisting of malaise, headache, a slight rise of temperature and, in some cases, a tendency to faintness, light duties are advised for the men for 24 hours. When symptoms are severe enough the men are admitted to hospital under the head of "Inoculation Fever." The usual time spent there has been from one to three days, with an occasional illness lasting five days or a week.

We have inoculated in District No. 2

between January 1st, 1915, and May 1st, 1915, 42,200 men three times each, making in all 126,600 inoculations. We have had no deaths from these and, while there have been a number of somewhat severe reactions, there have been admitted to hospital for this cause only 107 cases—less than one-quarter of the men inoculated, or about one admission in every twelve hundred inocu-

lations. (Over one-half of these admissions were during the summer months.)

We are now giving the combination of Para typhoid vaccines and, while only a few hundred men have been inoculated with them thus far, the early results are just as satisfactory as with the typhoid vaccine alone.

SCHOOL-CARE OF GIRLS DURING PUBERTY

By REV. R. I. WARNER, *Principal of Alma College, St. Thomas, Ont.*

SOME TIME ago, while in a drug store I noticed a large stock of opium and upon enquiry was told by the druggist, a man generally known as thoroughly reputable in business and in citizenship, that the quantity of opium sold was very large. He declared that he knew of drug stores which cleared sufficient profit on sales of opium to pay their store rent; that the number of opium habitues is greatly on the increase, and the increase is principally among women. He affirmed that the moral wreckage from the use of opium is such that he would gladly be quit of the whole opium business.

Later, in discussing with a medical man this situation, the medical man declared his belief that the modern school is largely responsible for this greatly increased use of opium, since the pupils and particularly the girls are so crowded with studies, during puberty and shortly after, that the proper physical development is interrupted, resulting in subsequent periodic distress for which opium has become the common recourse. From these premises is reached the important educational problem—what are the best school conditions for girls from 12 to 18? After 35 years' experience in teaching in a girls' boarding school, during the last nineteen years of which I was principal, I reached the following conclusions:

First, that the majority of mothers have no adequate idea of the importance of

this problem and usually none whatever of its solution.

Second, that the modern school program is quite unsuited for girls at this age; that this is more particularly true in mixed schools since their programs place the principal emphasis on severe mental rather than physical or emotional training.

Third, that a school, preferably a boarding school, is needed, and is possible, in which definite and scientific mothering of girls during puberty would be a specialty. The program of such a school would give physical efficiency and emotional balance the greatest possible attention. Much outdoor exercise and study would be indispensable.

Fourth, that this scientific mothering would be best obtained through the services of a supervising matron or lady principal having the ordinary training of nurse or physician with a special training in the subject under discussion. The co-operation and advice of a highly trained gynaecological specialist would naturally be exceedingly valuable in addition.

Such a school would furnish better health to the girls, truer ideals about motherhood, saner general education and an exalted sense of the essential dignity of the noblest of callings, that of homemaker.



We have just received a copy of the 1916 Report of the Board of Health for the City of Lachine, Que. The Medical Officer of Health, Dr. J. A. Baudouin, is to be congratulated on the efficient and

thorough manner in which the health of the citizens is looked after. Last year the amount spent was only \$8,959.59. This sum took care of the scavenging service, nuisance inspection, inspection of bakeries, groceries, restaurants, dairies, abat-

toirs, a house to house inspection, laboratory analysis of water and milk; the teaching of hygiene; medical inspection of schools and school buildings and the examination of 2,183 school children. The average rate of mortality has been reduced 1.43 per thousand since 1914. We hope the officials of the City of Lachine will continue to extend to Dr. Baudouin every encouragement and financial support as his example means much to the country at large.



BOOK REVIEW

PSYCHOLOGY OF RELAXATION—By Professor G. T. W. Patrick—Houghton Mifflin Company—\$1.25 net.

This book, which comprises a study of play, laughter, profanity, alcohol and war, refers all of these more or less to the necessity for a slower evolution than our too strenuous age attempts. Our sports and our wars are regarded somewhat as sediments of civilization, reversions to the serious pursuits of our remote ancestors for purposes of release from our own too arduous strain. What are fishing, baseball and the battlefield but exercises and scenes affording opportunity for catching, throwing, running and striking—activities without skill in which our ancestors could not hope to live.

Our author refers the origin of profanity, in part at least, to times when veracity was not regarded as a virtue, and swearing was needed as a seal to the truth. Alcohol, though a degenerating agent, gives a temporary relief from the strain and stress of life, the cure in this case being worse than the disease.

Laughter is regarded by Prof. Patrick as a mark of sudden release from tension, a forced relinquishment of a strained dignity, a lapse in the forward pull of evolution. Hysteria would thus be a rebound from extraordinary strain. Our author's study of this theme is remarkably luminous.

If the theories of our author be correct, it would seem that athletics in belligerent nations are for the duration of the war, quite superfluous.

In a concluding chapter, we are advised to relax the present over-stress of intellectual life and to encourage the less complicated exercises in the erect position, especially those which involve the use of the larger and fundamental groups of muscles and generally to lead a more robust and simple life. The arguments are scientific and carefully and ably presented. The rapid transformation of the earth into a world-neighborhood by modern science would seem to warrant more optimism as to the possible abolition of international war than our author indulges.—A. D. W.

ROMANOFF TSARS

By FLORENCE WITHROW

(Concluded.)

UPON the reconstruction of Europe, settled by the Congress of Vienna (1814), Russia was awarded the entire duchy of Warsaw, where until the Teuton recently dislodged him, the Russian governor sat upon the throne of the ancient Polish kings and spread the double-headed eagle over the faded insignia of the white eagle of Poland.

Alexander I. dying without heir, was succeeded by his brother Nicholas I. (1825), and immediately an insurrection arose demanding that Constantine, next in age to Alexander, should be banished, in spite of his having renounced all claim to succession on marrying a Polish Roman Catholic.

At this time Russia abounded in secret Societies, many having lofty aims for political reform and constitutional government, and to these belonged some of the best thinking and most highly educated men and women, but on the establishment of the reactionary Nicholas I. upon the throne, thousands of these political offenders were exiled to Siberia, and from their memoirs come graphic accounts of the privations and the austerities of that penal life.

Thus for a third time Russia failed to curtail the autocratic power of her Tsar, however Nicholas was forced to give a measure of reform, so issued a new legal code. Great ecclesiastical changes, also, were introduced, which would require reams of homiletics to explain, for splits and schisms had been prolific during the 17th and 18th centuries and creeds and doctrines had caused fierce controversy in the Greek Church.

From 1826 to 1828 Russia was again engaged in war with Persia and Turkey, but in coalition with England and France she rescued Greece from Turkish savagery and made her an independent kingdom after the decisive battle of Navarino (1829).

Next followed the periodic Polish insurrection, when an immense Russian army inflicted sanguinary reprisals upon the ill-effected people, who retaliated by attempting the life of Grand Duke Constantine, the Viceroy. Unfortunately the plucky Poles were subdued, hence the little that remained of their ancient kingdom was declared a Russian province and their University at Vilna was suppressed (1832).

In the same year the Ottoman Empire, finding itself sore pressed in the revolt of the Khedive of Egypt against the Sultan's suzerainty sought aid of Russia, although an hereditary foe, and in consequence a pact was formed for "mutual tranquility and security."

By another pact Russia again stooped in allying herself with Austria against oppressed Hungary during the Revolution of 1848, for which she gained only the ingratitude of Austria and the enmity of the Magyars. Afterward, the conservative Nicholas I. declared that two Slavonic sovereigns, John Sobieski of Poland (1683) and himself had made a fatal mistake in championing rapacious Austria, who forced dismal days upon Hungary, by hanging her patriots and taxing her citizens.

A few years later Russia entered upon the Crimean war (1854), for she had long desired to extend her boundary in the south, and seeing that Turkey was in a hopeless condition, Nicholas thought to win Constantinople. But as it was England's policy to keep Russia away from the Bosphorus, she straightway aided the Turks, and was quickly joined by Napoleon III., who wished to divert his subjects from home affairs, resultant upon his recent *coup d'etat*. Besides no love was lost between Napoleon and Nicholas, the latter having refused to acknowledge this Corsican as Emperor, and having ordered official mourning in his Court on

the death of France's last Bourbon King, Charles X.

The Crimean war developed into a most sanguinary struggle, in which the battles of Alma, Inkermann, Balaklava (with its brilliant charge of the Light Brigade), and the hard siege of Sebastopol were conspicuous events. Results were disastrous to Russia and Turkey, whose fleets in the Black Sea suffered almost annihilation and whose soldiers were slain by hundreds of thousands, the defense of Sebastopol alone costing Russia a quarter of a million lives. The Treaty of Paris concluded this dreary and unnecessary war, but although Russia renounced the long besieged city, a few years later she regained all that had been taken from her.

Nicholas I. weighed down with the turn of events and with the estrangement of all the rulers of Europe became a broken-hearted man. Since the woeful invasion of Napoleon I. no foreign army had trod upon Russian soil, and now her southern shores were held by a staunch foe. Not a single victory came to cheer the disconsolate monarch, who seemed deliberately to expose himself and long to die. From reviewing his troops one bitter February morn, he returned to his sick bed, where a fortnight later he died. He had been a good husband and father and an indefatigable worker for his beloved country, but unfortunately his inherited ideas of absolute sovereignty had blinded him to human rights, hence he was one of the most autocratic of all the Czars.

Alexander II., aged 37, succeeded his father (1855), and is notable, chiefly for his emancipation of the serfs (1861), whereby millions of peasants were released from feudal obligations and given the right to own the soil, which for long generations they had tilled as slaves.

Russia's rule in Poland proving intolerant, still another insurrection occurred on the thirtieth anniversary of the last revolution. Portraits of Kosciusko and other Polish patriots were paraded through the streets and a Republic was proclaimed, but the poor Poles having no force of arms with which to maintain it, Russia's disciplined troops quickly suppressed the revolt, hence by 1863 the Kingdom of Poland lost its last lingering relic of autonomy and

its great University at Warsaw became completely Russianized, the Polish language being forbidden. By a strange irony this city has since become the greatest emporium of Polish literature, where innumerable newspapers, reviews and books are published and scattered over the world.

Unremitting warfare seemed destined to be Russia's lot, for on her Circassian border the mountaineers, under their chief Shamil, continued their skirmishes until the ferocious leader was captured, when Russian rule was extended beyond the Caucasus, till it penetrated through Turkestan to within 500 miles of British India.

In a treaty with China at this time (1858), Russia also acquired valuable territory in Eastern Asia, where she created the port of Vladivostok, which became in 1895 the terminus of the great Trans-Siberian Railway, and which is to-day the port of entry of the supplies from Japan during the present war. Alaska, which she possessed through right of discovery (1741), she sold to the United States for the paltry sum of \$7,500,000 (1867).

The Moslem Turk, who has always been a menace to Christian nations (and who only a few months back again massacred the oft-persecuted Armenians) in 1877 again invaded Christian Serbia, but was driven back by Russia, who had many times before helped Serbia and Greece against Mahomedan fanaticism. As a result of this Balkan war, Turkey was compelled to grant independence to Roumania, Serbia and Montenegro and to part of Bulgaria. At this time was it that England acquired Cyprus.

Many were the attempts on the life of Alexander II., which ended in assassination while he was driving in the streets of Petrograd (1881). The Nihilists, who had departed from their original social, ethical and political principles to become anarchists and murderers, were responsible for this ferocious deed against one of the best of their rulers, who had been liberal and progressive in advancing education, trade, railroads, newspapers, etc., even though he had fallen short in political reform.

His son Alexander III. (aged 36), became intimately connected with the British

royal family through his sister's marriage with the Duke of Edinburgh, whose daughter is Queen of Roumania, and his own union with Princess Dagmar, sister of Queen Alexandra, but less beloved. Conspiracies postponed his coronation until 1883, and in 1888 he was visited by Kaised William II. shortly after the latter's accession to the German throne.

On account of Nihilist outrages the new Tsar's policy was quite the reverse of his father's, and stern repressive measures followed, which made his rule strictly reactionary. The Press became more censored, the Universities muzzled and the army and secret service greatly augmented. Ten to twelve thousand Nihilists were annually banished to Siberia, Jewish persecutions were encouraged and the mailed hand was extended to Finland, where the freedom of the Diet was interfered with.

Alexander III's harsh policy, urged on by his imperious consort, was his own undoing, since his nervous system broke under it and at the early age of 49 he died a victim of the autocratic system of his Sires and of a Bureaucracy which he had extended.

His son Nicholas II. (born May 18, 1868) is a kindly and reserved man who lacks initiative, and who doubtless, would be more democratic if he possessed stronger volition and had not been for years under the influence of so many Grand Dukes and uncles. In 1894 he married the daughter of England's beloved and deeply mourned Princess Alice, and his family consists of four daughters and one son, the delicate young Czarevitch (born 1904).

To Nicholas II. is due the credit of initiating the first Peace Congress at The Hague, as an outcome of his visit to France, when an alliance was made with that country, which holds firm to-day.

The present Czar is said to be the richest man in the world, with an annual income of thirty million dollars.

The most humiliating event of his reign was the war with Japan (1904), for which that ambitious little country made ample preparation. After the Chino-Japanese war, when by trickery Russia succeeded in having the Liatung Peninsula (where Port Arthur is) ceded to her, and her influence extended through Korea, Japan

rose in arms and both claimed and won these places for herself.

Russian ambition in the Far East, although checked, still persisted until, in 1911, as a result of the Shuster incident, she gained a dominant influence over Persia, which in spite of its independent Shah she still exercises, and at her dictate Persia was forced to dismiss Mr. Shuster, the able American whom she had invited to supervise her government finances.

Social unrest has been characteristic of Russia through many decades, for Nihilists, anarchists and socialists are indigenous to its soil. However, better political and industrial conditions have done much to improve the masses, so also has the Christian Socialism of the noble apostle of Brotherly Service, Leo Tolstoi (1828-1910), and as a result of this great war Russia will come into a new life.

In 1905 occurred the most momentous social revolution, which accomplished certain good, namely, the institution of the Zemstvo, or county council, and the declaration of the Czar's Manifesto sanctioning the foundation of a people's Duma or Parliament.

During this stirring year Father Gapon became a spokesman for the populace and arranged a monster deputation of working men, to march to the Winter Palace, but, unfortunately, the Czar, who did not distinguish between economic and political demand, fled from the city and authorized the militia to deal with the procession. Grand Duke Vladimir ordered the troops to fire upon the crowd, and soon the palace square ran blood. The Revolution spread to Moscow, then to all parts, and strikes and riots prevailed, until a state of siege was declared in a third of the Empire and the Czar remained concealed for a year. Seventy-eight newspapers were suspended, 58 editors imprisoned and 1,400 "politicals" or offenders against the Government were executed. An era of assassination arose, when the tyrant governor of Finland and the hated foe of all reform, Plehve, the Minister of Interior, were killed, also on February 17, 1905. Grand Duke Sergius, the most pronounced reactionary and "the worst royal type since Ivan the Ter-

rible," was assassinated within the Kremlin wall. Popular feeling at once demanded some definite promise of a Duma, which was forced from the Czar on August 6. The period of terrorism then passed away, and murder and massacre ceased until 1911, when Stolypin, the Premier was shot at Kiev.

As to the Duma, so long the dream of the Russian people, its first sitting was arranged for May 10, 1906. Its process of election was complicated, and Government-supervised, so that candidates not pleasing to the Bureaucracy seldom managed to be elected. Some members were immediately arrested and all of the 66 voted for by the workmen of Odessa were rejected and imprisoned.

The spectacle of the opening ceremony of Russia's first Parliament in the gorgeous Coronation Hall of the Winter Palace, is best described by Dr. Nevin Winter. "The Czar sat upon the throne in full panoply of power. Grand Dukes were there in rich regalia, senators in brilliant scarlet and gold, ministers of the Bureaucracy in gold lace, admirals, radiant field marshals, generals and august priests—a platform full of uniforms with stars and crosses and medals. Then came the Duma—sturdy peasants in homespun, one little Russian in purple and blue breeches, one Lithuanian bishop in violet robes, three Tartar mullahs with turbans, a Balkan peasant in white cloak, four Orthodox monks with shaggy hair, a few ordinary gentlemen in evening dress, and the rest in the clothing of the day. Shining with decorations were the Autocrat's minions on one side and facing them were the representatives of the people."

Later the Duma retired to shabby Taurida Palace, assigned to them, and began their deliberations by framing their first petition to the Czar, which he refused to receive and which caused this body soon to be dissolved.

For the next Duma the franchise was curtailed in order to eliminate super-

radical members. In Kiev 13,000 electors lost their vote because their humble habitations did not meet the Government's requirement regarding a home. After an unfair election the second Duma met March 5, 1907, but was dissolved upon a trifling pretext, and 50 of its members were arrested, 20 of whom were sentenced to the mines and 20 to exile.

For the third Duma the voters' list was reduced almost one-half. Stolypin was the moving spirit of the new Parliament, but on an accusation of duplicity in toadying to Bureaucratic power, he was shot dead in the theatre at Kiev, the Czar being present.

Elections for the fourth Duma were practically a farce, however, by October, 1912, the members were selected and formed the semblance of a representative body. Nevertheless the mere existence of a congress of the people augurs well for Russia's awakened future when this mighty empire shall become a constitutional monarchy. Moreover, a new epoch in the struggle for popular government dates from Feb. 22, 1916, when Nicholas II. appeared at the opening of the Duma, amid wildest enthusiasm, this being the first time an autocratic Czar ever visited the people's legislative body or even recognized it in a formal way.

Russia's phenomenal growth to nearly two hundred million, her agricultural and industrial development, and her political enlightenment are among the most remarkable facts in modern history. As to her military status and the integrity of her generals, officers and men, all the world knows, so mention is omitted here. The Russian bear is changing his very species and the Slav menace is becoming a groundless fear. Not an unworthy ally are the nations of All the Russias, and in this war for freedom, in which they heroically give their best, will they find that in losing their life they gain liberty and a new and freer life.

PUBLIC WELFARE

WHEN WE ARE OLD

When all is past, and earth's brief life is ending,

This shall sustain my soul in triumph then:

That God and man have loved me so divinely,

And I have loved and helped my fellowmen.

When we are old, our most pleasing reminiscence will not relate to our large acquisitions of wealth or learning, nor even to our great and famed achievements, but to the joy of having done humble things that made others glad, to the small services that cost us little, but introduced a comradely chord into the song of life.

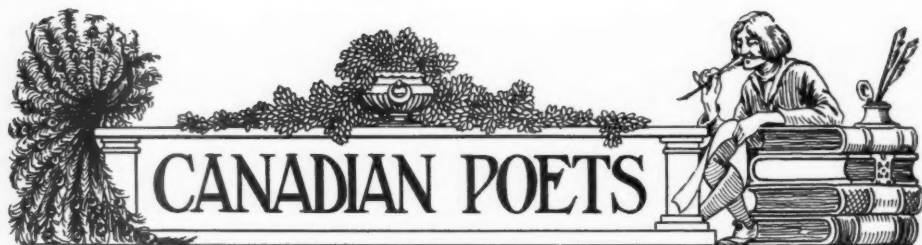
When we get used to being happy we carry with us a quite infectious joy. Nothing is more contagious than a happy, wholesome spirit. Our kindly feelings for others become, after a while, an atmosphere of pleasant memories and good-wishes, which, though we may never analyze them, are nevertheless, our own kind thoughts come home again to make us glad.

Do you ever feel depressed? Get the habit of being delightfully but unobtrusively pleasant to others. It will mean more to you by and by than ten fortunes, in the gladness and comfort it will bring to your heart. The depression will lose its force and frequency and loneliness will die out of your life.

We are in the process of making. Later, we shall be whatever we have made ourselves. By learning to do little things beautifully, kindly, pleasantly, we shall, by and by, do great things as we have done the small ones, with nobility and dignity, as if they all were great, yet with simple and gentle courtesy, as if they all were small.

This will mean health. Neuritis is often just irascibility that has taken root, nervousness, a pathological self-concern. Many diseases are acute attacks in the course of a chronic self-regard. Good-will is a good medicine. A little service that we did without much thought, but which made some one like us, multiplied by repetition through days and months and years, will at length bring an army of angels to our side, a cloud of witnesses who desire our well-being. Life is worth living only when we love one another.

—Albert D. Watson.



CANADIAN POETS

XXVII



DR. J. D. LOGAN

The writer says in his Preface that his work is no better and no worse than what might readily be accomplished by any man of education and literary instincts. Thus it will be seen that Dr. Logan does not claim to be a poet. But what he writes is, so essentially national, so strong in spirit, and deals so closely with what is good material for poetry that 'Songs of the Makers of Canada' is the most authentic little book of Canadian poetry that we have this year. . . . ! Leaving discussion of Canadian nationalism for the moment to one side, where else can one find poetry which is as fair an attempt to express Niagara, as Dr. Logan's poem, 'The Over-Song of Niagara'? The individual finds at Niagara what he brings there, but this searching out of a mood is far nearer the expression of the indescribable Niagara than the mere exclamations of wonder which precipitate writers generally call the poetry of Niagara.—Marjorie MacMurchy in the Canadian Courier.

AN outstanding figure in present-day Canadian literary circles is John Daniel Logan, M.A., Ph.D.—outstanding as a writer of original and scholarly treatises on academic subjects, as a critic of literature and of music, and as a poet.

Dr. Logan was born in Antigonish, Nova Scotia, on May 2nd, 1869,—the eldest son of Charles and Elizabeth Gordon (Rankin) Logan. He was educated at Pietou Academy, at Dalhousie University, and at Harvard University. From Dalhousie he graduated with highest honours in Phil-

osophy and with the degree of B.A., in 1893, and was granted his M.A. the following year. While engaged in post-graduate work at Harvard, he had the distinction to win the Derby, Price Greenleaf and Thayer scholarships, and to receive the degrees of A.M. and Ph.D. The latter degree was conferred in 1896.

In 1897, Dr. Logan married Miss Minerva Shepard Bromer, of New York.

During the next five years he was a practical educator, holding the Principalship of Hampton Academy, New Hampshire, in 1898, and for the remaining four years, the Professorship of English and Philosophy, in the State University of South Dakota.

Retiring from the teaching profession, he was employed for several years as advertising specialist for Siegel, Cooper & Co., of Chicago and New York.

In 1908-10, he was literary and music critic for the *Sunday World*, Toronto, and later was a member of the staff of the *Toronto Daily News*.

The following are Dr. Logan's principal publications: "The Structural Principles of Style" (1900), "Preludes, Sonnets and

Other Verses" (1906), "The Religious Function of Comedy" (1907), "Quantitative Punctuation" (1907), "Democracy, Education and the New Dispensation" (1908), "The Making of the New Ireland" (1909), and "Songs of the Makers of Canada, and Other Homeland Lyrics" (1911).

This prominent litterateur is at present a private in "A" company of the 85th Overseas Battalion, Halifax, N.S., but his talent as a writer is not lying dormant, as he is the Battalion's Chief Publicity Agent, and Editor of *The Thistle*, and as he is devoting spare hours to the completion of several important literary works.

Last winter Dr. Logan delivered a series of lectures on Canadian Literature, in Acadia University, Wolfville, N.S., the first of the kind ever delivered in a Canadian University.

The Great War and his enlistment as a soldier have inspired this brilliant author to write a number of new poems, notably "Timor Mortis" which is striking in conception and treatment and which is charged with an unusual depth and intensity of feeling.



CARTIER: DAUNTLESS DISCOVERER

(Sailed Westward, 1534, 1535, 1541)

Hail, Master Mariner of Sainte Malo!
Whose name hath been a star for centuries,
Why ventured thou thrice o'er tempestuous
seas,
In ships antique and frail? Didst thou
then know
The greater issue of thy bold emprise
And trust an unseen providential hand
To guide thee westward to an opulent land
Wherein a mighty nation would arise?

O bold Sea-Rover, instrument of God,
Whose occult purposes were wrought
through thee,

A grateful people hail thy name, and laud
Thy dauntless spirit of discovery!

Thy glory sure, rest, Rover, rest, while
blow

The winds in requiem round Sainte

CHAMPLAIN: FIRST CANADIAN

(Founded Quebec, 1608)

Wise Colonist who in this storied place,
With wisdom prescient of thy pregnant
deed,

Cast forth the sparsate grains of fruitful
seed,

Whence sprang a virile and a patriot race:
Thy aims were not to found a merchantry
Enthralled by vulgar gain; but thy just
mind,

Inspired with love of thy benighted kind,
Raised here the throne of Christian empery.

Intrepid, constant, nobly pure and strong,
First citizen of Canada's domain,

Behold, this ancient city is thy fane
And thy compatriots raise thy name in
song.

Look downward from thy lofty resting-
place

And mark the regnancy of thy just ways.

LAVAL: NOBLE EDUCATOR

(Founded Quebec Seminary, 1663)

Laval, High Priest of Knowledge, who first
 scann'd
 The years to come, and saw the pow'rs that
 lay
 Within the docile hearts thy truth should
 sway,—
 Whose work is puissant still upon this
 land,—
 Thou wast the Spirit's patient paragon
 In those far, pristine, mercenary days
 When thou alone wast master of the ways
 That lead into the vale of Avalon.

Lo, now a people learned in all the arts
 Greet thee to-day across the distant vale
 Of Truth, where dwells obscure the Holy
 Grail.

And tho they commerce oft upon the marts
 Of specious gain, they look beyond the
 mist
 To thee, their first great Educationist.



BROCK: VALIANT LEADER

(Fell at Queenston Heights, 1812)

O valiant leader of the little band
 That, fearless, forward rushed to victory,
 Tho far outnumbered by the enemy,
 And, daring death, saved our Canadian
 land,—
 What honors can we pay the noble name
 Of one who held as naught th' invaders' art
 Of war,—whose glory hath become a part
 For evermore of our Canadian fame?

Lo, on the looming crown of that ascent
 Where thy life ceased, a loyal host hath
 reared
 To thee—whose patriot heart was pure, nor
 feared,—
 A high commemorative monument!
 Still is thy memory green who fell to
 save,
 Still, Brock, art thou the bravest of our
 brave!

DRUMMOND:

INDOMITABLE SOLDIER

(Victor at Lundy's Lane, 1814)

From saffron dawn that lit the morning sky
 Until the moon passed, blanching at the
 sight
 Of fearful slaughter crying for respite,
 Thy faithful forces heard thy battle cry
 Above the stubborn, fierce, tumultuous
 sway
 Of weltering lines. Then thy undaunted
 heart
 Sustained thy heroes in their awful part
 And glorified the sanguinary fray.

To us yon battleground is as a fane,
 A holy place, a sacrificial spot
 To thee and thy Canadian host who
 wrought

Immortal warrior deeds at Lundy's Lane;
 And thine own glory, Drummond,
 gleameth far,
 Undimmed and constant as the purest
 star.



THE TRUE IMPERIALISM

O Canada, the sweep of empire rolls
 athwart
 Thy broad, abounding lands, prefiguring
 the part
 Which thou must take unswervingly!
 On east and west the conscious seas reverb-
 erate
 Their far-sounding theme: "Thy future
 way lies straight;
 Achieve thy fated destiny!"

Too long the Earth hath waited for the
 genial hour
 When justful Time should set the King of
 Righteous Pow'r,
 With Peace, as Queen, upon the throne!
 Mark how the saddened throngs who never
 knew the reign
 Of kindly Law and Plenty flock to thy do-
 main;
 Take them as children for thine own!

Give them thy vital succor hence, that they
 may grow
 To manhood's fullest stature; teach them
 soon to know
 The acme of the human kind!
 What boots it tho thy hospitable lands sus-
 tain
 Ten thousand thousand hosts, if they shall
 never gain
 The pure possessions of the Mind?

Turn not, as avaricious nations in the past,
 To thrall of Riches and the rule of Might:
 at last

Relentless Fate wrought out their fall.
 Choose thou, O Canada, the spiritual plan:
 So shalt thou rear a new-bred, sov'reign
 race of Man,—
 High-destin'd and imperial!



THE OVER-SONG OF NIAGARA

Why stand ye, nurslings of Earth, before
 my gates,

Mouthing aloud my glory and my thrall?

Are ye alone the playthings of the fates,

And only ye o'ershadowed with a pall?

Turn from this spectacle of strength un-
 bound—

This fearful force that spends itself in
 folly!

Turn ye and hark above the organ-sound
 My Over-song of Melancholy!

"I rush and roar

Along my shore,—

I go sweeping, thundering on;

Yet my days, O man,

Are but as a span,

And soon shall my strength be gone!

My times are measured

In whose hand I am treasured,

(Think not of thy little day!)

Though I rush and roar

Along my shore,

I am passing away—

Passing away!

"The sun and the moon

They too shall soon

Sink back into eternal Night:

All earth and the sea

Shall cease to be,

*And the stars shall melt in their
 flight!*

Their times are measured

In whose hand they are treasured,

(Think not of thy little day!)

The celestial throng

Chant my Over-song,—

'Passing away,—

Passing away!'"

Then stand not, nurslings of Earth, before
 my gates,

Mouthing aloud my glory and my thrall:

Not ye alone are playthings of the fates,

Nor only ye o'ershadowed with a pall!

But hark to my song

As I sweep along,

Thundering my organ-tone—

"O vain is all Life,

O vain is all Strife,

*And fruitless the Years that have
 flown!*

As the Worst; so the Best—

All haste to their rest

In the void of the Primal Unknown."



WINIFRED WATERS

Winifred Waters, when I look on you
 now,—

With the sweet peace of God on your beau-
 tiful brow

As you lie lily-white in your lone lethal
 bed,—

I will conjure your spirit, sit here at your
 head,

And talk to you, dear, whom I lost, and
 recall

Our vows when I swooned to the ineffable
 thrall

Of your eyes that once rivalled the jewels
 of Night,

Of your kisses that dropped more delicious
 and light

Than the rose-leaves that perfume the
 drowsy June air,

Of the glorious gold in your hyacinth hair,
And the treasures of love that we pledged
for the days
When our souls should discover Earth's
winsomest ways.

O Winifred Waters, mellifluous name
That enamored my soul as rare music, I
came
To the wells of Love's wine, and I drank
there elate,
Then I joyed daily forth, till an untoward
fate
Snapped the cords that enchained us, heart
unto heart.
So I passed to the world. You, cloistered
apart
In the lonely-celled nunnery of unchang-
ing grief,
Awaited Time's advent with his mortal
relief,
Till you drooped like a sun-famished lily,
and died.
But I am come, dear, at length, and here
by your side
I commune with your spirit while I look on
you now,
With the sweet peace of God on your beau-
tiful brow.
Lo, I kiss your cold hands; I warm them
with tears
And possess you again after long widowed
years.

O Winifred Waters, I re-pledge you above
Your casket, and find there the Treasury of
Love.



WIND O' THE SEA

(A Reverie)

O wandering minstrel, wild Wind o' the
Sea,
That knowest the innermost being of me
Who love thy rude sport with the measure-
less brine,
And whose spirit is wayward and vagrant
as thine,—
O wandering minstrel, sad Wind o' the
Sea,
That learnest world-secrets by swift
errantry,

Blow hither to me o'er the wide Eastern
main
And tell me what meaneth the poignant
refrain
Of surges that moan like sad souls in their
sleep,
And those shuddering shadows that darken
the deep.

Blow, wild Wind o' the Sea!
Blow, sad Wind o' the Sea!
And speed with thy lay to thy lorn devotee.

Then the Sea-wind sang forth:

"I blow from afar
The ocean's accompaniment to the war
Of the beast and the god that dwell in thy
soul,
Forever at strife for the gain of the whole
Of thy manhood's estate, of thy love and
desire,
So thou sink to the one; to the others aspire.
"And the deep, dark, shuddering shad-
ows," he shrilled,
"Are the planes of thy life which Destiny
willed—
The devilish depths of thy sensual hours
When the beast in thy soul thralls thy
senses and pow'rs—
The shadowy heights of thy consecrate days
When the god in thy soul is lord of thy
ways."

Thus ruthlessly sang the wild Wind o' the
Sea
That learnest soul-secrets by swift errantry.
Ah, wild Wind o' the Sea!
Ah, sad Wind o' the Sea!
That revealest the innermost being of me.



TIMOR MORTIS

"For he to-day that sheds his blood with me
Shall be my brother.
And gentlemen in England now abed
Shall think themselves accursed they were not
here."
Shak., King Hen. V.—Act IV, sc. 3 (King's
speech prior to the battle of Agincourt).

I wend my ways with one dire dread
Now daily in my heart:
The fear of death obsesses me—
The fear that I may pass
Too soon for my desiring eyes to see
The English camps, and for my feet to
tread

The English green-sward grass;
 That I, who've heard my God's, my King's,
 my Country's claims
 And, though belated, have at length begun
 A larger life of holier aims
 Than was my wont, may suddenly depart
 This shattered world to utter oblivion,
 Ere I, in Christian chivalry,
 With brave, devoted comrades dauntlessly
 have stood face to the foe
 On Flanders' fatal fields and struck a
 single blow
 For man's dear brotherhood and world-
 wide liberty,
 Or ere, upon the blood-steeped slopes
 Of France, I've met—mine eyes afront,
 my soul quite undismayed—
 The Hunnish cannons' fearful fusilade
 Or done my share to still the Hunnish
 hopes,
 And thus to leave secure, ev'n if by my
 poor martyrdom,
 A happier heritage to generations yet to
 come.
 Dear God, oh, privilege me the fullest
 bloom
 Of vital-strength, that I may pay the price
 For my too selfish, easeful days; spare me
 to live
 That I, if it should be Thy will, may sacri-
 fice
 The meagre all I now can give,
 And, falling, lie obscurely laid within a
 nameless tomb.
 Perchance, round where mine unknown
 grave may be,
 Unshaded by Canadian maples, unsung by
 winds from my Acadian sea,
 I shall in spirit-state revisit foreign slope
 or plain
 On which I fell, and there aloft desery
 The Flag of England still flaunting vic-
 tory to the sky,
 'Neath where the hellish holocaust once
 swept amain,
 And I shall know I died not in dishonor
 nor in vain,
 But that I may, at home, in peace, untried,
 yield up my breath—
 This is my direst dread, my fear, of thee,
 O Death!

WHAT OTHER BOON?

What other boon than Thee—and Love—
 shall I,
 When I must pass to silence, surely
 crave?—
 What other comforters above the grave?—
 Not solely those sweet prayers of priests
 nearby,
 Nor that remembrancer of Christ's re-
 demptive death—
 The hallowed crucifix—upraised before my
 sight,
 Nor low-toned litanies and candles' peace-
 ful light:
 Nay, not to ask for only these will I em-
 ploy my ceasing breath,
 As if forgetful of my finitude's most
 wonted cheer.
 They are for my stained soul's absolving
 when I hear
 The dread inevitable Call,
 And for my soul's safe wafture when the
 swart, unwelcome pall
 Forever cloaks mine eyes from Earth's
 pervasive thrall.
 But at my final passing let there be
 Vouchsafed these gifts of joy and solace
 temporal:—
 One look at that illimitable sea
 Which, years ago, first nursed and
 cradled me;
 And at the sun when he has reached his
 western gate
 And, like a royal lover, radiant, elate,
 Beams gloriously, with king-like bow,
 And on the waiting hills' broad dusky
 brow
 Imprints his golden good-night kiss;
 And shortly ere the death-mist veils mine
 eyes, let this
 Be my last boon from Earth—my last
 sweet taste of Earth's delight—
 To wait the coming of the quiet stars, and
 watch the Night
 In silence shepherd them as sheep
 And at the Dawn's first stirring fold them
 in—and me—for sleep.

Art and Artists in Canada

By Katherine Hale

There is a little lost lane called Severn street, running off Yonge, whose only notable structure is a sort of large, yellow biscuit box which, as you approach, resolves itself into a studio building.

On the first door to the left you read the name "Marion Long," and as the

in a thousand most skilfully drawn. That woman could not have worn other than a red shawl. She is everything that red of that peculiar magenta shade, curiously blended with geranium, implies. Near her hangs a young girl in purple; slight, dreamy, looking as if she might step out



THE SISTERS

artist answers your knock, you enter a big, airy room which gives a sense of space, and a lack of undue detail that is at once restful.

Instantly your eye is drawn to that canvas by which Miss Long is perhaps best known, "The Red Shawl," an arresting study of a woman who looks Italian (but is, I believe, of Canadian birth), one of those almost mediaeval ladies, full of fate and mystery, whose dark eyes are sombre and haunting. In other words, one model

of her canvas and walk away at a moment's notice. On the other wall is one of the dearest Madonnas that any Canadian artist has painted.

Do you remember how of old—nearly all the famous European Madonnas will bear me out in this assertion—the sainted mothers look soulfully into space, while adorable babies smile unregarded upon their knees, or gaze into space from out their arms? The mother seems to be unconscious of the child. Modern art is

more human, and the Madonna of which I write, painted by Miss Long, appeals to me with a celestial as well as a human meaning. The woman in her blue gown (and here is the psychology of color again, for how could the gown have been other than blue to match such a mother face as bends over this baby?) seems to be enhaled by the mystic love that she gives, and finds, in the small cherubic eyes into which she looks so adoringly. That blue Madonna haunts one.

Everywhere in this studio are portrait sketches of singular vitality. There is a freedom and yet a fidelity about the work that is fascinating. And there is a strong love and understanding of color. A real "color-sense" seems to be almost as rare as what the musicians call a sense of "perfect pitch." It is something inherent with a few people, though I suppose, like almost everything else, it may be acquired by long and painful effort.

I noticed one little canvas, a small Italian fruit shop, with its awning up and the gay wares gaily spread beneath it. We have all seen it on a hot summer morning, and loved its tropical fervour. Here it is, imprisoned and picturesque forever.

Indeed, in looking at canvas after canvas, it has seemed to me that Miss Long loves life very intensely, be it low life or high, and her impulse is to catch and translate vitality. The teachers she has had would foster this spirit, for they are all artists whose work is strong rather than "pretty." Mr. George A. Reid, of Toronto, Miss Laura Muntz, and later on Kenneth Hayes Miller, William Chase and Robert Henri, of New York—these are not masters who have much patience with finicky effects. They see life in the whole, and as Miss Long said of Henri, "Everything that is full of strong life is to him paintable."

So much has already been accomplished by this young artist, and there are such possibilities ahead that one would hope that next season will see an exhibition of her work in Toronto. It is sincere and strong work—and beautiful withal.

* * * * *

The Bard we celebrate! Shakespeare or Bacon, that is the question! Whether to be lulled by tradition and fed on fairy

tales, to believe in boisterous Will, and the Divine Afflatus blowing in a perfect gale o' wind through that Stratford actor so that he knew not what he wrote, but wrote madly by the grace of God, or to listen to friend Reason, and the almost indisputable claims of an author, a statesman, a poet, a gentleman, a man of the world, so clever that he could well afford and well effect a masquerade—that is the question! Yet, after all, what matter! The Bard we celebrate is as lusty and active to-day as he was three hundred years ago, and his only personality is in his deathless work.

Personally, I celebrate Bacon—but you are quite welcome to Shakespeare.

We saw his bust, by the way, at a proper Tercentenary at the Heliconian Club, on the 29th of April, a tiny colored bust from Stratford-on-Avon—Alas! how many souvenirs would be thrown away if it should be Bacon! Some of the pupils of the Margaret Eaton School of Dramatic Expression enacted scenes from "Much Ado About Nothing" on this occasion.

On the 26th, in the Oddfellows' Hall, the Drama League of Toronto gave two performances (afternoon and evening) with scenes from Shakespeare, under the direction of Mr. Barnum Barton. Shakespearean dances by pupils of Miss Sternberg, and a group of Shakespearean songs by Mrs. Homuth Marshall.

In spite of an impossible stage and very poor lighting effects, Mr. Barton managed to give interesting pictures in scenes from Hamlet, Much Ado, and the Merchant of Venice. It was the trial scene from the latter which will linger in the memory, because of Mr. Farnum Barton's excellent Shylock, and the really beautiful and impressive Portia of Miss Catherine Beverley Robertson, a young Canadian actress who has had some experience on the American stage and is, for the time being, living in Toronto. Her Portia was memorable for dignity, authority, and above all that innate womanliness which she recounts in the lines that we quote elsewhere in this article. Miss Robertson exemplified the fact that it takes an artist to think out any real conception of a part in the first place, and that in all true acting the outward vehicle is but

the expression of this creative attitude towards art.

* * * * *

Talking of the Drama League and the theatre, it is interesting to learn that in the United States little theatres are rapidly multiplying, and there are many movements afoot for developing community theatres; municipal, neighborhood, and settlement theatres, and even church theatres—indeed, drama is creeping into the Sunday Schools.

On the other hand, there is the vogue of the movies. Who can estimate what this will eventually mean? At any rate the conventions and the commercialism of the theatre have been rudely and wholesomely shocked. It is clear that the theatre must pick up the gauntlet thrown down by the movies. It must adjust itself to new conditions, and produce a new art of the stage. It must meet the demand for better plays, lower prices, more commodious theatres, more rational staging, and a higher consideration of the actor—still in eclipse under a discouraging "Star" system; his individuality flouted by old-fashioned drill-masters.

Many other crucial questions are raised by the present situation: Can the theatre win back the gallery patronage it has lost to the movies? Must we despair of the commercial theatre, and turn to the people's theatre, the endowed theatre, or municipal theatre?

To these issues the Drama League, and we have several branches in Canada, must address itself. It must aid and direct the gathering dramatic interests and energies. It must democratize the drama and help to create audiences for the future.

* * * * *

Mrs. A. Starr Best, who recently lectured in Toronto, reports in a recent number of the Drama League that the most significant work of the year and perhaps the most interesting thing ever done by any centre was accomplished by the Ottawa League last fall. After months of work and tactful manoeuvring on the part of its president, the Canadian Government finally presented to the Centre the use of a very beautiful auditorium to be used and equipped as a Little Theatre. Here for the first time on Canadian territory and almost the only time on the continent

was established a municipal theatre under Government patronage. The centre eagerly equipped the theatre and showed its appreciation and sincerity of purpose by immediately devoting itself to the public good. For as soon as the theatre was ready the centre produced and presented a play for young people to which it invited the school children of the city. Not only did it give its performance free, but a splendid committee secured transportation and conveyed audiences of one thousand school children for two successive nights to see the charming production in the Municipal Theatre. Here is an example for the large theatres to note, when one of our smallest centres—only 120 members—achieves such a significant success. Very bitter, however, was the aftermath, for when the terrible fire destroyed the beautiful Parliament building, the Dominion Government was obliged to borrow the Municipal Theatre from the Ottawa Centre, and the House now holds its august sessions there. It is, however, some consolation to have made a start, and we congratulate the centre on its brilliant success and hope for a speedy return to its former triumph.

* * * * *

A delightful recital was given at St. Margaret's Hall on Saturday evening, May 6th, by Mr. Leo Smith, 'cellist. He was assisted at the piano by Mrs. Doris Dennison Chapman, and one of the most melodious numbers on the program was Percy Grainger's Colonial Song, Mrs. Leo Smith (Lena Hayes) with her husband and Mrs. Chapman, making the trio.

In the well known Brahms Sonata for Violoncello and Pianoforte in F Minor, Mr. Smith again proved himself a master of his instrument, playing the exacting music with splendid balance, and the Bach Saraband and Gavottes with joy and abandon. But it was in the two brief compositions of his own that he was revealed as that rare spirit, a genius. In his Indian Romance, and an Irish Fragment, the "Ride to Ballymure," he has used simple themes, but used them with vital, and one might also say, passionate effect. The Pentatonic or five-note scale to which nearly all the primitive races cling is inherent to the Indian. Mr. Smith has punctuated his melody with the fate-

ful sound of the tom-tom, and the effect is lovely and haunting.

"The Ride to Ballynure" the composer describes as a traditional tune from County Antrim and says, "The story merely recounts that a pedestrian walking along the road to Ballynure overhears 'a wee lad making love to his wee lass.' Rather humorously 'the wee lad' claims he has a cordial eye which far exceeds the cordial of his country, i.e., whiskey. I have attempted a very free paraphrase of this, omitting entirely the mood of the story, and centering rather on the motive of the refrain—a recurring rhythmic metre suggestive of a ride along the country road. To this I have endeavored to add a somewhat quixotic vision and argument on the part of the riders, but which terminates in disaster at the moment of the triumphal accomplishment of their purpose."

One can only say that the musical conceptions and the playing of Mr. Leo Smith are quite out of the ordinary, and the warm, brown 'cello, that most Rosetti-like instrument, sings anew in the hands of a real master.

* * * * *

One was glad, by the way, to hear good music the other evening in that most unlikely place—a moving picture theatre.

The Strand, on Yonge Street, possesses a small but excellent orchestra—more than can be said of other theatres in Toronto. I heard a really good 'cello solo by Mr. Oswald Roberts, which seemed to be much appreciated by the audience. As a usual thing, the opportunity to give pleasure to that proportion of the public who care for music is little reckoned by the managers of the movies, or even of the legitimate theatres in Canada, and should be encouraged by the public.

* * * * *

One of the most interesting recitals of the season now drawing to a close was that given on Saturday evening, May 27th, by the pupils of Mr. B. C. Carman, himself an artist of acknowledged ability, a pupil of the celebrated Matthay and of York Bowen of London, England. The programme was remarkable for the fine technique and thoughtful interpretation of the pupils, whose work covered a wide range of "schools" and composers. Especially noteworthy was the work of Miss Alice Bryan, a brilliant Irish girl, in two Debussy numbers, and the "Danse Negre" of Cyril Scott, and Miss Dorothy Massey's rendering of a Schumann Romance and the well known Fantasia in D Minor by Mozart.

THE ACTRESS—TO PORTIA

There is no woman of our world may half-express thee,
Thou Lady of sweet Will's most magic pen;
Perennial Youth, his wondrous genius gave thee—
Lovable, beautiful, now as then!

Radiant, joyous, unconquerable ever,
Loving, beloved, faithful and simply-good;
Created once, to be a joy forever;
Wise with the wisdom of all womanhood!

How may I hope to tell the world thy story—
Whose heart beats time to march of men—who kill—
Tell thy creator: "Though her *soul* be sorry,
"She cannot half portray thy Portia, Will!"

—C. B. R.

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THE CONSTRUCTION OF A SANITARY DWELLING

*Read before the Winnipeg Members by W. A. THORNLEY, Deputy Assistant
Chief Health Inspector, Winnipeg Health Department.*

I HAVE selected the above title for my short paper instead of Building Construction, as I am dealing with Sanitary Inspectors, and the question of strength of lumber, the size of brickwork, the ductility of steel, and the many points to be mentioned when dealing with Building Construction, are not of such interest to the Sanitary Inspector as nature of sub-soil, position of building on location as to healthful surroundings, drainage, water supply, cellar construction, number and size of windows, whether made to open properly or not, sanitary fittings, and many other points which have a direct bearing on the healthy or unhealthy condition of the dwelling.

As the subject of construction is one of considerable dimensions and could be only half told in a paper many times the length of the one before you, I will confine my remarks as nearly as possible to the construction of a sanitary dwelling house.

Allow me to say here, that a building constructed along sanitary lines does not of necessity imply that sanitation is more costly than a principle which totally disregards healthful conditions. On the contrary, I should feel more inclined to state that sanitary building construction is generally speaking, more economical than insanitary methods.

Assuming, however, that material for material, the cost of the building, erected on sanitary lines should be slightly in excess on completion of the other class of

building, health being the greatest consideration, the slight additional cost so incurred should not be considered.

It is a deplorable fact, however, that indifference, and often gross carelessness is shown in matters of the most profound importance by those who place their lives in the hands of the builder and plumber, whose aim very frequently is to get through his work as rapidly and as cheaply as possible, and will feel like shaking hands with himself if his work can just pass muster with the building inspector, the plumbing inspector or the sanitary official as the case may be.

A casual glance through the newspaper ads. of houses to let or for sale, the show cards in the window of the real estate man, will show that sanitation is far from having a high seat in the minds of the advertising public; for the ad. generally refers to the size of the lot, where situated, size and style of house, painting and whether hard or soft wood finished. Scarcely ever a word said about its dry soil, efficient weeping drains, perfect drainage system, correct plumbing, high class sanitary fittings, healthful local surroundings, correct windows and doors admitting of proper ventilation, being placed sufficiently far from the neighboring dwellings or premises to ensure an uncontaminated air supply, water supply and other conditions essential to a healthy home.

As before inferred the general public is also too apathetic with regard to these

most important principles. These principles sink into insignificance with some people, compared with being in a fashionable locality, cramped in an apartment suite because the fashionable Mr. or Mrs. So-and-so live in this style, the outside of the premises having an attractive appearance, the number of reception rooms, good electric bells, smartness in appearance of the plumbing fixtures, electric fittings, style of papers, color of paint and similar considerations, all of which have their place of importance but should be less than secondary in thought or feeling when compared with principles on which the health and even life of the occupants depend. It might be a compliment to the sanitary administration of the city that so few enquiries are made by intending purchasers or tenants about to enter into occupation of premises, as to the sanitary condition of the same, but it is nothing less than folly for any person to occupy a house, no matter how elegant in appearance, how clean in condition, or how well located, until he or she has fully acquainted himself or herself as to the condition of the drains, whether proper connections are made to the public sewer; if the water supply is good, plentiful and absolutely above suspicion; whether the soil is dry and every provision made for surface and subsoil drainage, seeing that windows are made to open both at the top and the bottom; such an assurance can only be given after a thorough examination of the premises by a sanitary expert.

All these considerations apply to the home in the crowded part of the city, or where the benefit of a suburban residence is the happy lot of the person.

In country districts where no sewer is available or public water supply is at hand and no possibility of providing sanitary fittings, all other conditions above mentioned apply, and in addition great care must be exercised in the question of excremental and waste water disposal.

The healthy home is essential for the tired city clerk, and man of business or laborer, and others who only occupy their homes in the leisure of evening and night of rest; and is even more essential for wife and children who spend the greater part of their time in the dwelling.

In the foregoing I have certainly digressed from actual construction of the dwelling and dealt with conditions and principles; I will now touch lightly on construction.

In a rapidly growing city and where the population is increasing by leaps and bounds and where the cost of building materials is ever advancing and never declining there is always the chance for the jerry builder.

If he is building for speculation he will buy his material at the cheapest market, he will secure the poorest kind possible compatible with passing the eye of the building inspector; he will rush through his work with all possible speed, employ the cheapest help obtainable, and thus ensure the poorest possible workmanship. He will, however, as a rule be very careful to have his paint either as gaudy or as neat as possible, according to the class of prospective purchaser he is catering for. The poor victim takes the bait, is allured into possession and very soon discovers that cracks are showing in the cellar walls, the floor of the cellar is crumbling from scarcity of cement or poor workmanship, the drains are getting out of order from settlement or from some fault in construction; cracks showing in plastered walls and ceilings, allowing harbors for dust and vermin, windows and doors twisted and cracked from poor fitting of frames or made from unseasoned wood. Sashes sticking from same causes; floors sagging and springy from bad workmanship or unsatisfactory material, and joists too light; the chimney flue settling and cracking, allowing danger from fire, the heating plant hot air or water getting out of repair, and contributing to the general discomfort of the dwelling. Plumbing fittings becoming loose and causing trouble; and the whole business a source of continual expense and endless anxiety to the jerry builder's poor victim.

Whether the house is built of stone, cement, bricks or lumber, all such conditions are possible, as are herein mentioned.

Let Us Consider a Sanitary Dwelling House.

First consideration—the site. The lot should be if at all possible not less than

50 feet in width and not less than 120 feet in depth; under no circumstances should the lot be less than 33 feet by 120 feet. The best direction for your house to face is the south or south-west. Should you, however, be compelled by force of circumstances to build on a lot on the south side of your street, that would mean your house facing north, then arrange the interior of your house so that you and your family live as much at the back of your home as possible, so as to take advantage of all available sunlight, for sunlight is absolutely essential to good health.

The next consideration is nature of the subsoil.

Do not choose a clay subsoil if you can avoid it; gravel, or sand and gravel, is an ideal subsoil.

The reasons are obvious, but I should mention them. Water is held up by the clay, causing damp surroundings; while gravel or sand and gravel afford an easy filter for water and ensures a dry foundation.

The next consideration is:

Your surroundings. See that you select a lot, high and dry, well away from any air-polluting influences, such as garbage tips, manure piles, sewage polluted streams or ravines; let there be plenty of trees on your lot, or in your neighborhood; be careful not to remove a tree unless you find it absolutely necessary to do so; see that your lot is so graded that all surface water flows away from your house and not towards it, in any part whatsoever.

The next consideration is:

The water supply. In the modern city this is not a serious problem, for the individual home-seeker, but in the suburbs or in the country, do not be tempted to build your home where a good and sufficient water supply is not obtainable.

Having settled all these preliminaries you will now be ready to proceed with your building proper. If you are building without the services of a contractor, your first consideration is to secure the best material, consistent with the class of building it is your intention to erect.

If your house is to be a frame building, reject at the outset any unseasoned lumber.

Beginning at the basement:

The first act is to make the sewer and water connection.

The connection to the public sewer should be preferably by heavy iron pipes; but if glazed tile pipes are used they should be laid in a bed of good concrete, of not less than six inches in thickness under the pipes with hand holes for the sockets of the pipes to rest in, and for ensuring a perfect joint. The joints should be made of neat Portland cement, care being taken to trowel the outside of the joint to a perfectly smooth surface, and to wipe out with a cloth the inside of the joint, not leaving a trace of cement on the inside of the pipes; for if even a small piece of cement is left inside the pipe or of the invert, caused by an improperly made joint or by a pipe not being exactly cylindrical—is not perfectly uniform, particles of paper, hair or foreign substances improperly entering the drain, will be arrested by this obstruction to the flow, and in a short while, the sewer connection will be entirely choked; gaskin is sometimes used to prevent the cement being forced through the joint to the interior of the pipes; this is not a bad system if the work is neatly and properly executed; for it also gives a better chance for a perfectly true invert being maintained.

The sewer connection should be laid with a sufficient and uniform gradient to the public sewer and connected with a Y junction or Y saddle and in the direction of its flow.

The connection should be hydraulically tested before being covered with concrete; a testing junction being fitted next to the sewer junction for this purpose; the water for testing should be left in till the concrete above the pipes has set.

The practice of laying the water service pipe in the same trench, and side by side with the sewer connection is not a safe practice.

Tile drain pipes or glazed stoneware pipes have been known to fracture even when laid in a thick bed of concrete, but the laying of such pipes is more often on more primitive lines than above mentioned; hence the necessity of proper protection against contamination of the water service by defective drainage.

There would be but little chance of such contamination, if the water were on the constant supply and always at high pressure in the mains; but it is a well known fact that the water is frequently turned off in the water mains; and if the service pipe should happen to burst, or be defective, the water would run out, and if the sewer connection should be in any way defective the soil about same would soon become contaminated and such contaminations could easily enter the now empty service pipe, and thus contaminate the drinking water for the house.

All the foregoing remarks apply to a house of any and all dimensions, from the smallest and most insignificant cottage to the palatial mansion and largest possible apartment block.

The house under consideration being constructed is a two-storey frame building containing full basement. On the first floor, dining room, parlor, kitchen, pantry and hallway. On the second floor, three bedrooms, bathroom (containing bath and wash basin), water closet apartment and landing.

After the proper excavation has been effected the sewer connection made, the water service pipe laid above the concrete covering the sewer connection, the next consideration is the basement; this should extend under the entire surface of the house. The walls should be of hard bricks laid in cement mortar, cut stone also laid with cement mortar, or concrete, composed of gravel, sand and Portland cement; or in lieu of gravel, broken stone may be used.

If the walls are composed of bricks there should be two distinct walls all round; a nine-inch wall laid on footings of concrete, with damp-proof courses of pitch or pitch and slates, or pitch and cement in layers. There should also be a four-and-a-half-inch wall similarly laid on the outside of the nine-inch wall; both sides of this should be thickly covered with pitch to a height of 12 inches above outside level, the space between the four-and-a-half and the nine-inch brick work should be grouted with fine concrete composed of fine gravel, sand and Portland cement; or crushed stone can be used in place of the gravel. This should ensure

an absolutely damp-proof brick basement wall.

Proper weeping drains must be laid completely round the walls; and subsoil drain so laid as to collect any water finding access to the foundations; these drains should be laid with a uniform gradient and made to discharge under the grating of the catch basin.

The catch basin should not exceed 10 inches in diameter; the interior should be cylindrical in form, with a perfectly smooth cement surface. The bottom should also be of smooth cement, and properly dished to a syphon trap. There should be a fitted iron grating over the catch basin.

Stone or concrete could be used for basement walls, in which case the entire part below the surface of the ground should be back plastered with cement and sand, and this back plaster coated with pitch.

Heavy iron drain pipes should be used for soil drains, properly connected with the sewer connection already mentioned. These pipes should be well and truly laid with proper disconnecting trap, fresh air inlet, ventilating pipes and other fittings. The soil drain having been laid, a concrete floor of not less than six inches in thickness should be laid with a proper gradient from every part to the catch basin; the surface should be trowelled to a smooth finish.

The furnace should stand at least one inch above the level of the floor and should be quite plumb. This method of fitting would prevent damage by water when flowing over the cellar floor to the catch basin.

The rain water tank is a very real necessity in a sanitary dwelling, but sufficient care is seldom exercised in its construction to maintain healthy conditions. It is invariably built on the level, with a draw-off cock an inch or even two inches above the level of the bottom.

In many instances the tank is built to within a few inches of the joists, and is invariably left open at the top. It thus very soon becomes foul; dust from the cellar is admitted from the top, washings from the roof drain into the tank; these deposits are frequently allowed to accumulate year after year; dead birds and

insects being amongst the debris in the tank.

Then on account of (a) its inaccessibility, (b) its being level and (c) its drain off cock being fitted too high, the cistern is never cleaned out.

Pumping out does not clean the tank, for the bottom layer of dirt or sludge cannot be removed by pumping.

The tank should be kept at least $2\frac{1}{2}$ feet from the joists; it may be as wide as desired.

There should be a sump at one edge of the bottom of the tank, three inches deep, by nine inches in diameter.

A $1\frac{1}{2}$ or even 2-inch cock should be fitted to the edge of the bottom of this sump, and there should be a gradient of two inches at least in the bottom of the tank towards this sump.

The bottom of the tank should rest on a concrete bed previously made to receive it. There should be a domed grating or fine mesh placed over the sump to collect any foreign substances that may have found access to the tank.

There should be a three-inch overflow pipe connected to the cistern near the top and conveyed to the top of the catch basin.

The cock from the sump should discharge into this overflow pipe. The cistern should be covered with a light galvanized iron cover, made in two parts, and supported in the centre with a galvanized iron pipe or bar stretched across the top of the tank.

The walls of the basement must not be less than nine feet high; at least $4\frac{1}{2}$ feet should be above ground level, the window area should be more than 1-20 of floor space, particularly if placed near other dwellings.

All windows should be made to open, and kept open, according to outside temperature.

The cellar or basement must be kept perfectly clean, as it is from the basement that air is drawn for all parts of the house.

Having given so much attention to the basement and foundations of the house,

there is not much time for discussing the superstructure, so we will pass over materials, and deal with broad principles only. All rooms should have at least one external wall with window. Every room should be so designed as to allow currents of air to pass right through, windows should always be opposite to doors or rather placed on opposite walls. All windows should be fitted with box frames, or so that the windows may be opened readily both from the top and bottom. The windows should be placed where most light and air can be admitted. If so near to a house or other building that the light strikes at a less angle than 45 degrees the one-tenth in relation to floor space is not sufficient; in fact, the one-tenth is far from adequate except on a window facing due south or south-west; one-eighth should be the minimum.

If possible fit a ventilation tube or shaft to your house and let all rooms be ventilated into same by an opening near the ceiling. This ventilating duct or shaft should be adjoining a chimney stack so as to be kept warm and an up-cast current always induced.

All rooms should be not less than nine feet in height, and an allowance of free air space of at least 600 cubic feet for each adult and 300 for each child under ten years.

Let the bathroom contain a bath and a wash basin only.

Let there be a separate w. c. apartment; each of these rooms being well lighted and well ventilated.

The floors either oiled and very hard painted, or covered with close-fitting oil cloth or linoleum.

There should be no papers on walls or ceilings. These should be painted, the lower parts of the walls tiled.

General.—The rain water troughs and leaders should be so fitted as to collect the rain water from every part of the roof or porches and convey same to the rain water cistern in the basement.

Avoid all dust-collecting or dirt-harboring places.

Walls and ceilings should be very hard plastered and very smooth.

It is best to paint these surfaces; but if papers are used, they should be very smooth and washable.

Time limit and space prevent the fullest discussion or even slight reference to the design or details of construction of the roof, only to say that the roof should be of substantial construction, due care being exercised as to its being watertight; every part so formed as to ensure rain water flowing to the eave troughs and rain water leaders.

Similar conditions also preclude any discussion of, or reference to, the construction of stairways, halls, hearths; the dimensions of joists, purlins, rafters and beams; cupboards, doors and numerous

other points essential in the construction of a sanitary dwelling.

It has only been possible in this paper to simply refer to the principal points to be noted in the construction of a sanitary dwelling. An entire paper could easily be devoted to several of the individual points.

I would, however, state in conclusion, that careful supervision during construction is desirable; very close attention being paid to the selection and fitting of the sanitary conveniences, including the laying of the soil and weeping drains; remembering that such precautions will ensure the maximum of comfort and a minimum of subsequent repairs.



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